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CHAPTER FORTY

Department of Neurosurgery

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"With all our varied instruments of precision, useful as they are, nothing can replace the watchful eye, the alert ear, the tactful finger, and the logical mind which correlates the facts obtained through all these avenues of information and so reaches an exact diagnosis."

—W.W. KEEN (1837–1932)

IN ORDER to appreciate the development of neurosurgery at Jefferson one should understand its growth in earlier years and other places. Archeologic evidence of ancient trephined skulls in Egypt and South America tempts the erroneous belief that the oldest form of the practice of medicine was neurosurgery by forgetting that soft tissues do not remain. Old methods persist, as testified to by the Korea of the early part of the twentieth century, where people were still trephining the skull for insertion of a needle to permit the escape of the "evil spirit" causing smallpox.[1]

The evolution of knowledge regarding the functions of the nervous system, its diseases, and particularly its surgical treatment had been relatively slow until the middle of the nineteenth century. Contributions came mainly from Italy, France, Germany, and England. In surgery, the focus was on head injuries, and military surgeons were prominent in the care of them. James Yonge[2] in 1682 collected 60 cases of brain wounds and wrote a book to refute the accusations that "all brain wounds were mortal."[3] Toward the end of the eighteenth century and the first half of the nineteenth, a curious reaction set in with regard to

neurosurgical procedures. Surgeons were divided between those who continued to advocate trephining frequently and those who were very conservative.[4] The emphasis had been on the technique, almost as an end in itself, of creating an opening into the skull. Trephination, then craniectomy, and ultimately the modern osteoplastic flap initiated by Durante in Italy (1884) evolved. It is of interest that skull defects were repaired with coconut shells by South Sea Islanders, later by a gold plate (Petronius, 1565), canine bone (into the skull of a Russian monk by J. van Meekren, 1670), and celluloid (Fraenkel, 1890).[5] In 1888 R.F. Weir emphasized the importance of replacing the bone chips after craniectomy and noted that Clarke of Glasgow had already used this technique in 1886 (as had MacEwen since 1873).[6]

Undoubtedly some major innovators and contributors to the art have gone improperly recognized, or not at all. Berlinghieri dictated to a pupil a 488-page manuscript from 1810–1813, never published, detailing his technique for operating for meningiomas by craniectomy.[7] Traditionally, the priority is ascribed to Godlee in London (November 23, 1884) for the first successful removal of an intracranial (brain) tumor, followed by or before Durante's removal of a fibroma of the skull base on June 1, 1884 (1885?).[8] Nevertheless, MacEwen wrote that on about July 22, 1879, he had removed a "whole" intracranial meningeal tumor pressing on the frontal lobe.[9] Moreover, Pecchioli in Italy (1835) removed a meningioma of the right sinciput, and at 30 months there was no clinical evidence of recurrence.[10] In 1856 G. Gioppi in Italy cured a carotid-cavernous fistula by intermittent digital carotid artery compression.[10] It was May 9, 1883, when MacEwen removed a spinal, extradural fibrous neoplasm in a complete transection syndrome with remarkable recovery of the patient. Even Maydle in Vienna (1882) and Morris in New York (1885) had attempted to unite the severed ends of the spinal cord. Finally, Sir Victor Horsley (1857–1916), a giant in the development of neurosurgery in England, was the recorded first to remove an intradural meninigioma of the spinal cord (June 5, 1887).

Early Neurosurgery at Jefferson

Joseph Pancoast, Professor of Surgery at Jefferson (1839–1841) and Anatomy (1841–1874), in *A Treatise on Operative Surgery* (1844), did not include surgery of the nervous system except for a detailed, well-illustrated section on trephination of the skull for trauma. Nevertheless, in 1862 he devised a skillful operation to section the second and third divisions of the trigeminal nerve by transcoronoid approach to the skull base. Likewise, Thomas D. Mütter, Professor of Surgery at Jefferson (1841–1856), wrote extensively on trephination and general care of head injuries in his book on surgery (1846).[11]

In contrast, we find much about neurosurgery in *A System of Surgery* written in 1859 by Samuel D. Gross, Jefferson's esteemed Professor of Surgery from 1856 to 1882. One is struck by the great length of this and other medical texts of those days until one sorts out specifics from an incredible amount of verbosity. Gross wrote in a most detailed manner about diseases of the head and nerves, brain concussion, brain compression (by blood, bone, pus, and foreign body), details of trephination, and chronic hydrocephalus treated by puncture of the skull decades before ventricular puncture was first attributed to Keen in 1888 but actually proposed by Vose of New York and practiced by others before then. He also wrote a section on diseases and injuries of the spinal cord and column that included cord concussion, wounds, lateral curvature, tuberculosis, psoas abscess, and hydrorachitis (meningocele). In a sixth edition in 1882 he discussed tumors of the skull and dura and commented that Grosmann and Pecchioli were able to achieve total extirpation of dural tumors by trephining the skull. One of the earliest textbooks of neurosurgery was *Chirurgie Operatoire du Systeme Nerveux* by A. Chipault (1891). Considering the early state of the art this was quite sophisticated and well illustrated, with each of the two volumes consisting of more than 700 pages.

With so much surgical brilliance in those early days, one wonders why there was such a delay in the development of more modern neurological surgery. The answer lay in three deficits: lack of anesthesia, horrendous surgical sepsis, and the absence of any system of cerebral localization. When these problems were gradually solved by the

explosion of medical knowledge and technique in the latter half of the nineteenth century, modern neurosurgery came alive. Ether anesthesia was initiated by Crawford Long, M.D., in 1842 and then "officially" by William Thomas Green Morton, D.D.S., in 1846. Joseph Lister first used carbolic acid for surgical antisepsis in an operation in August, 1865. George W. Corner has pointed to the contrast between the two surgical clinics painted by Thomas Eakins.[12] In the *Gross Clinic* of 1875 there is a pre-Listerian ambience to the scene, whereas a relatively antiseptic atmosphere is depicted in the *Agnew Clinic* of 1889. Lister's *Antiseptic Principle in the Practice of Surgery,* first published in 1867, was accepted very slowly and reluctantly. Lister visited Philadelphia in 1876. W.W. Keen heard him and is said to have been the first surgeon in Philadelphia to have adopted his technique.

The ophthalmoscope was invented by Babbage in 1847, but the idea was dropped until Helmholtz "officially" invented it in 1851. It appeared in neurologic diagnosis in 1860.

The concept of cerebral localization evolved more slowly and over many centuries, generating much controversy, especially when it was demonstrated that both cerebral hemispheres could be removed in a dog that thereafter could still walk. In 1861 Broca gave an autopsy demonstration of softening in the speech center in a man aphasic for 21 years. This led some to denote Broca "The Father of Neurosurgery." Alex Robertson (1866), Hughlings Jackson (1869), Fritsch and Hitzig (1870, cortical electrode stimulation on animals), and Ferrier (1870) provided laboratory and clinical proof to firmly establish the concept of cerebral localization and to permit accurate brain surgery well before the discovery of bone imaging by the X-ray beam in 1895–1896.

To William MacEwen of Glasgow belongs the distinction of chief pioneer of craniocerebral surgery.[13] Even before Rickman Godlee, F. Durante, or Victor Horsley, MacEwen operated successfully for intracranial tumor, abscess, and extramedullary spinal cord tumor.[14]

To William Williams Keen belongs the credit of being America's first brain surgeon. He was a general surgeon like the other pioneers who made great contributions in this field that became established by Harvey Cushing in the twentieth century. That chapter might have been written differently if MacEwen had not rejected the offer of the Chair of Surgery at Johns Hopkins, which went to William Halsted, because the Trustees could not assure him that the supervision and training of nurses would be under his absolute control.[15]

Philadelphia was not only the birthplace of medical education in America but also the focus for the investigation and care of nervous system diseases by Benjamin Rush, John Kearsley Mitchell, W.W. Gerhard, Robley Dunglison, S. Weir Mitchell, W.W. Keen, William Thomson, Roberts Bartholow, William Osler, Charles K. Mills, Francis X. Dercum, Eadwaard Muybridge, and many since then.[16] J. Ewing Mears (Jefferson, 1865), on the Jefferson surgical faculty in 1884, was the first to suggest Gasserian ganglionectomy for tic douloureux.[17]

W.W. Keen was a Philadelphian who, after graduating from Jefferson in 1862, was assigned by the Union Army to the Turner's Lane Army Hospital in Philadelphia to work with another surgeon, George R. Morehouse (Jefferson, 1850), and under S. Weir Mitchell (Jefferson, 1850) to care for war injuries of peripheral nerves. They documented their intensive study of 120 patients in an outstanding 164-page monograph, *Gunshot Wounds and Other Injuries of Nerves* (Lippincott, 1864), one of the most important medical contributions from the Civil War, and enunciated the concept of causalgia and reflex dystrophy. Of interest was a soldier they observed on July 15, 1863, in whom they documented and explained his traumatic Horner's syndrome six years before Horner's description. One is puzzled by the lack of any mention of surgical treatment for those nerve injuries. In 1866 Keen began teaching pathologic anatomy at Jefferson, which he continued for the next nine years. He concurrently directed the Philadelphia School of Anatomy, lecturing upon anatomy and operative surgery to "the largest private class ever assembled in this country."[18] In a historic operation in 1893 he assisted Dr. John Erdmann in the removal of a verrucous carcinoma from the upper jaw of President Grover Cleveland. This was performed in secret aboard the yacht *Oneida* on Long Island Sound.[19] He was a prolific author with a bibliography of at least 405 items. Of these, 249 were papers on medical, surgical, and allied subjects. The largest group, more than 50, were

written on diseases of the nervous system.[20] He wrote on intracranial lesions, tapping and irrigating the lateral ventricles (for the first time, 1889), cortical ablation of the hand center for focal epilepsy (1890) utilizing electrical stimulation, and craniectomy for microcephalus in 1890. This was the first patient with this anomaly to be operated upon.[21] Keen also performed linear craniotomy for the same condition. In 1891 he devised and performed a new operation for spasmodic torticollis, namely, division of the upper cervical posterior primary nerve divisions.[22] Finney in 1925 said it was the first really carefully studied, scientific attempt to treat this condition. Keen also reported on Gasserian ganglionectomy, peripheral nerve surgery (including successful nerve grafting), and intracranial tumors. He wrote, edited, or made neurosurgical contributions to many important textbooks.[23–27]

Dr. Keen's most celebrated neurosurgical operation was the removal of an intracranial convexity meningioma from Theodore Daveler on December 15, 1887. This patient survived for more than 30 years. Dr. Aller G. Ellis, a Jefferson pathologist, then went to Lancaster, Pennsylvania, to perform the autopsy and retrieve the brain, which was free of any tumor. This was the first documented successful removal of an intracranial tumor with a proven cure.[28] The tumor specimen and the brain were demonstrated by Dr. William H. Whiteley for surgical neuropathology instruction at Jefferson for more than 15 years until the tumor was apparently thrown out by a careless workman at a bicentennial exhibit in Philadelphia in 1976. Some time later the brain itself also disappeared. Keen's historic operation was performed at Saint Mary's Hospital in Philadelphia, at which time he was Professor of Surgery at Woman's Medical College (1884–1889).

Upon the death of Samuel W. Gross in 1889, Keen became Professor of the Principles of Surgery and Clinical Surgery at Jefferson, occupying that chair until 1907. Dr. Edward L. Bauer noted that "William Williams Keen occupied the center of the surgical stage in America and indeed in the world for many years, even after the days of his Professorship."[29] Dr. John Fulton in his biography of Harvey Cushing identified Keen as "Cushing's principal predecessor in neurosurgery in this country."[30] Dr. Edward Klopp in the 1936 student yearbook remarked that Keen became America's first "Brain Surgeon" and was regarded as the foremost surgeon in the country.[31] Keen also had deep religious convictions and wrote and gave many addresses about theological, devotional, and church missionary matters. He wrote much for the lay press and was an outspoken proponent of vivisection experiments, although he participated very little in such. Dr. John Chalmers DaCosta portrayed him as a "wonderful operator—absolutely fearless—always in a heavenly temper—no superiors as a teacher."[32] It has been suggested that his need to counter the grief from the rather sudden death in 1886 of his wife, who was under the care of Dr. William Osler, drove him therapeutically to an intense level of work, writing, and other accomplishments.[33] Despite that analysis, he had already produced 34 medical papers, six lay papers, and four books before her death. Although Keen retired from practice and teaching in 1907, he continued to be most active and to receive many honorary degrees, honors, and awards until his death in 1932 at the age of 95.

The responsibility for neurosurgery at Jefferson must have been assumed by other general surgeons, although it is difficult to find much concrete evidence of this. In 1907 Alfred Gordon reported on a craniotomy performed by Francis T. Stewart, later Professor of Surgery at Jefferson.[34] John Chalmers DaCosta in 1894 published *A Manual of Modern Surgery*, in which there are three chapters on the surgery of the head, spine, and nerves. These chapters are even more comprehensive, and obviously still personalized, in the tenth edition of 1931. In the 1920s and early 1930s it seems that Dr. Thomas A. Shallow, Professor of Surgery (1931–1955), was responsible for neurosurgery.[35]

The focus of neurosurgery in Philadelphia temporarily shifted to Charles Harrison Frazier (1870–1936), the eminent neurosurgeon and Chairman of the Department of Surgery at the University of Pennsylvania, who was training Fellows in surgery and neurosurgery.

Dr. William Duane, Jr., was the first specific neurosurgeon at Jefferson (Figure 40-1). He was born in 1900, one of four children of William Duane, Ph.D., the illustrious physicist who worked with the Curies in Paris (1907–1913) as

Radium Research Assistant. Duane, Sr. then became Professor of Biophysics at Harvard (1917–1934). It may be significant that his assistant was William T. Bovie, Ph.D., to whom credit has been given for developing the high-frequency electrosurgical "knife" and coagulator in response to impetus from Harvey Cushing. Bovie received the John Scott Medal from the City of Philadelphia in 1928 for his achievement despite the claim by George A. Wyeth, M.D. of New York that he had perfected such an apparatus and presented it to the Surgical Section of the New York State Medical Society in April, 1924, two and a half years before Cushing's initial and famous operation using "the Bovie" on October 1, 1926.[36]

FIG. 40-1. William Duane, Jr., M.D., Jefferson's first specialized neurosurgeon. (Courtesy of Archives of University of Pennsylvania)

Duane, Jr., graduated with an A.B. degree from Harvard in 1923 and most likely was influenced by Bovie's work. He received his M.D. degree from the University of Pennsylvania in 1927 and was a research fellow under Frazier, finally becoming an Instructor in Surgery in Frazier's Department and later under Francis Grant, neurosurgery Chief. He was a neurosurgeon at the Philadelphia General, Mount Sinai, and Graduate Hospitals in Philadelphia when Dr. Thomas Shallow brought him to Jefferson as Demonstrator of Surgery in 1935 to be responsible for neurosurgery. He contributed little to the medical literature but did devise a modification of the McKenzie silver clip and applicator forceps, changing the shape of the clip from a *V* to a *U*.[37] Dr. William H. Whiteley (Jefferson, 1943) assisted Dr. Duane in May, 1943, in an unusual operation upon a man with a massive skull defect. Although Zander in 1940 was the first to use acrylic for cranioplasty, such had not really appeared in this country until Guardjian's as yet unreported case of 1942.[38,39] Duane persuaded an Air Force pilot friend to obtain a broken piece of extremely thick bomber nose which he meticulously and successfully shaped with a coping saw to fill in that skull defect. On October 11, 1943, Duane resigned to enter military service and served in the campaigns in Europe. In 1946 the *Philadelphia Inquirer* reported that he had cared for General Patton for his fatal cervical spine injury in Heidelburg, Germany. Duane abandoned neurosurgery after resuming civilian life, but was appointed Medical Instructor of Anatomy in the Medical School of the University of Pennsylvania (1948–1950). He died September 14, 1963, at the age of 62 after a long and chronic illness.

Jefferson's most important neurosurgical affiliations were with Wills Eye Hospital and the Wilmington Medical Center. Until 1938 neurology and neuro-ophthalmology at Wills were related to the Graduate Hospital and the Graduate School of Medicine of the University of Pennsylvania. Dr. Thomas A. Shallow, who was on the Board of City Trusts, had Dr. Duane appointed to Wills as Chief of the Neurology Service on June 10, 1938. Later he was joined by Dr. Nathan Schlezinger (Jefferson, 1932) who eventually replaced him in that position after a few years of titular command by Professor Bernard J. Alpers. On June 4, 1943, Dr. Duane became chief of the Neurosurgery Service, a consultative position, but only for a few

months before entering military service. In the meantime, Dr. Rudolph Jaeger had arrived at Jefferson and shortly became the neurosurgical consultant at Wills, a position he retained for many years. All of this provided a vast number of both medical and surgical neurological/neuro-ophthalmological patients for Jefferson for both treatment and student and resident training. The loss of this pool of important and fascinating cases to another institution after about 1979 was most unfortunate for Jefferson.

John C. McNerney graduated from Jefferson in 1927, spent a year at Jefferson Hospital as Resident Physiological Chemist, and then two years as an Intern. After four years in general practice he became an Instructor in Anatomy at Yale, followed by a year's study in pathology, particularly neuropathology. This led to a year's training in neurosurgery under James G. Gardner at the Crile Clinic in Cleveland. He returned to Jefferson in 1937 to work under Dr. Duane and with him at the Philadelphia General Hospital. These were Jefferson's two neurosurgeons at the time. Dr. McNerney was on the faculty as Assistant Demonstrator of Anatomy (Neuroanatomy), but he left Jefferson in 1941 to become an Instructor in Neurosurgery at Temple University. Shortly thereafter he went into military service in World War II. In 1948 he became Chief of Neurosurgery at the Naval Medical Center at Bethesda, Maryland, for two years, eventually entering private practice in Stamford, Connecticut.

For the first time in the College circular of information of 1938–1939, neurosurgery was mentioned as a teaching discipline in the Department of Surgery, indicative of the slow development of this specialty in this institution. Jefferson's first neurosurgeon at professorial rank was Robert A. Groff.[40] He was a Philadelphian, born in 1903, and graduated from the Medical School of the University of Pennsylvania in 1928. A paternal uncle had graduated from Jefferson in 1898. Groff trained in neurosurgery under Charles Harrison Frazier and Francis Grant at the University of Pennsylvania, under Harvey Cushing in Boston, with Gordon Holmes at Queens Square, London, and with Otfrid Foerster in Breslau, Germany. He became a somewhat itinerant surgeon, working on the staffs of nine hospitals in the Philadelphia area. He was appointed as Assistant Professor of Neurosurgery at Jefferson on February 2, 1942, but served for less than one year, when he entered the army in World War II for four years. He was the first board-certified neurosurgeon (also in neurology) at Jefferson. After the war, he resigned from Jefferson on January 7, 1946, and returned to the Graduate Hospital and the University of Pennsylvania. He became Department Head and Professor of Neurosurgery until 1968 at the University and at the Graduate Hospital until his death in 1975. Groff published many articles, including a book in 1945 entitled *Manual of Diagnosis and Management of Peripheral Nerve Injuries*. Like W.W. Keen did from his Civil War experience, Groff incorporated his learning as a military surgeon. One of his greatest achievements was the training of about 40 neurosurgeons.

The American Board of Neurological Surgery was established in 1940. In 1933 there was only one training program in neurosurgery, at the Medical College of Virginia, with just one position available there. In 1934 there were six training centers in the United States providing nine positions. At the zenith, in 1964, there were 152 training program centers with 522 positions. In 1984, there were 94 programs and 674 positions in existence with 650 filled.[41] In Philadelphia in 1943 the only two training programs in neurosurgery were at the University of Pennsylvania and Temple University. The two cities in Pennsylvania where specific neurosurgical care was available were Pittsburgh and Philadelphia. At Jefferson as late as 1941–1943, Dr. William T. Lemmon, often called "the last of the great general surgeons," did most of the neurosurgery. The time was ripe and long overdue to establish a Department of Neurosurgery.

The Jaeger Years (1945–1961)

J. Rudolph Jaeger (Figure 40-2) was born October 29, 1895, on a farm near Clarksville, Missouri, a small village on the Mississippi River. He attended a one-room schoolhouse before high school, graduated from the University of Missouri, and received his M.D. degree from the University of Pennsylvania in 1920. After internship and chief residency at Denver General Hospital, he joined

his uncle in the practice of general surgery in Denver, Colorado. He was also Instructor in Surgery and Neurology at the University of Colorado School of Medicine. He taught anatomy for six years and was in charge of pathology and physiology at the University of Denver School of Dentistry. It is not certain when or how he became interested in neurosurgery, but in 1928 when he foresaw the coming Great Depression, he moved his family to Baltimore and spent nine months with Walter Dandy, the famous neurosurgeon at Johns Hopkins. The totality of his neurosurgical training consisted of observation only, no patient care, and no personal surgical experience. Because neurosurgery was mostly

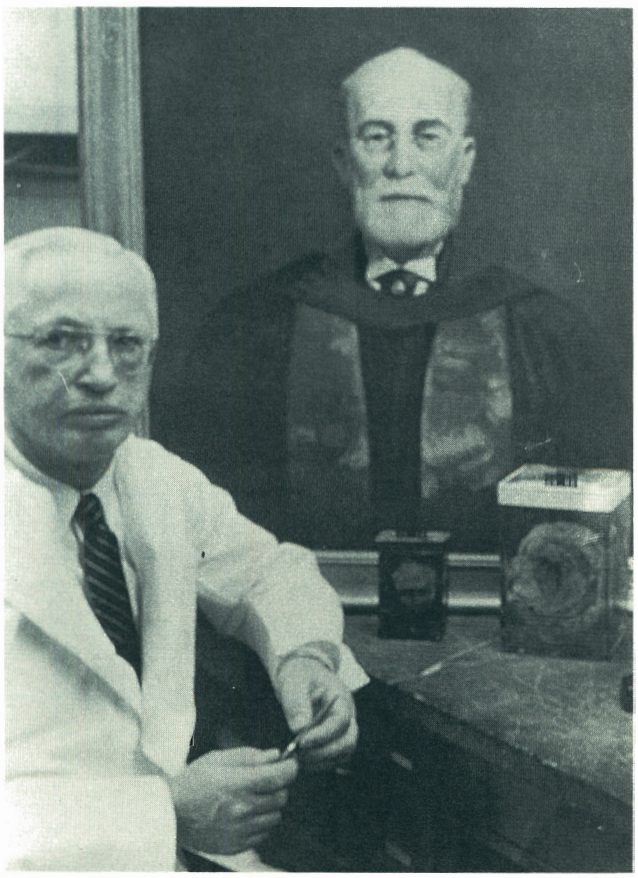

FIG. 40-2. Rudolf Jaeger, M.D., Head of the Division of Neurosurgery (1943–61). The portrait is that of W.W. Keen, Jefferson's pioneer in neurosurgery.

cavitary and more instrumental than manual, he took Dandy's advice and spent much time in the ear, nose, and throat clinic examining cavities and learning to use and modify nasal instruments. He then returned to Denver as a surgical pioneer and became the first neurosurgeon not only there but in all the Rocky Mountain states.

Until 1943 Dr. Jaeger's exceedingly busy professional life included being the only neurosurgeon on the staff of six hospitals and Chief of Neurosurgery at the University of Colorado School of Medicine. He wrote 14 of his eventual 61 scientific papers, and made most of the neurosurgical motion pictures for which he became famous. He spent much time and energy in teaching medical students, and he emphasized to the profession at large the benefits of neurosurgical care, in view of the rather widespread pessimism about it. In fact, as late as the 1960s there was a surgical professor at Jefferson whose routine greeting to this author was "Whiteley, how is your vegetable garden today?" Jaeger's motion pictures were dramatic demonstrations of surgical triumphs, very popular at scientific meetings and conventions. He was the first to show a motion picture at an American Medical Association convention exhibit. By 1959 he and Dr. Whiteley had produced 21 films detailing all the major neurosurgical procedures.

In late 1942 Jaeger was seeking relief from the overwhelming burden of work in Denver. He was also President-Elect of the United States Chapter of the International College of Surgeons, of which Professor Thomas A. Shallow at Jefferson was President. The invitation from Shallow and Dean Harvey Perkins to come to Jefferson, confine his activities to this institution, and initiate and develop a Department of Neurologic Surgery was therefore most welcome. To that time he had not trained Residents and was anxious to do so. Dr. William Whiteley was selected as Jaeger's first Resident after a directive from the Board of Trustees of May 25, 1943, initiated a Division of Neurosurgery in the Department of Surgery. It remained a Division until it obtained Departmental status in July, 1969.

A serious problem in Jaeger's leaving Denver in early 1943 related to the war and the efforts by the government and the medical profession to continue to provide adequate community health care. The other three neurosurgeons had already gone into military service and Jaeger was the only one remaining for a vast geographical area. When the War Manpower Commission heard of his

proposed move to Jefferson it raised a great outcry and objection. Of course Jaeger had no intention of leaving until he found his own replacement, which became Olan Hyndman of Iowa City, Iowa.

Jaeger, like other surgeons at Jefferson, had to be in charge of his own anesthesia. When he arrived he brought along his own equipment for administering inhalation anesthesia and for endotracheal intubation, including his suction pump and a blow torch that he had personally modified and transformed into an adapter for giving open-drop ether. Dispersion of operating rooms on the second, third, fourth, sixth, eighth, and fourteenth floors, and in three different buildings, not including the outpatient department, constituted an anesthesiologist's nightmare. It was not until 1955, after the Foerderer Pavilion had been erected (1954), that operating space was concentrated and a Department of Anesthesia begun.

Instrumentation was inadequate and required designing, crafting, modifying, and repairing, all in a special departmental workshop. Innovations in specialized pre- and postoperative care were needed. A neurosurgical art/photography facility for scientific papers, teaching, and scientific exhibits had to be developed. Other demands included teaching medical students, nurses, residents, and the profession at large, conducting neuroradiologic procedures and, finally, developing an experimental research laboratory. Jaeger was not only a skillful surgical technician but mechanically ingenious and an innovator. He devised many neurosurgical instruments and operative techniques, which included an excellent headlight that he eventually manufactured and marketed, aluminum and gold aneurysm clips and applicator forceps, disc removal curettes, forceps and retractors, apparatus and monitoring techniques for safe surgery in the erect position, a method of and instrumentation for continuous spinal drainage during brain surgery, an improved technique for cordotomy with more permanent results, and a catheter technique for intravenous fluid and blood administration, long before any commercial devices were available. He also developed a technique for fractional prefrontal lobotomy using at first electrocoagulation and then hot water injections into the frontal lobes. Especially effective was his method of Gasserian ganglion destruction through percutaneous hot water injection for the relief of tic douloureux and cancer pain. One week before he died he performed that technique on his five hundred twenty-fifth injection patient with tic douloureux.

In those days the neurosurgeon performed all neuroradiology procedures except for some pneumoencephalograms and myelograms, which the medical neurologist shared. In 1949 a neurology Resident, Dan C. Donald, Jr., devised a method of cerebral angiography that was performed by the neurosurgical resident, Stacy L. Rollins, Jr. (Jefferson, J1944).[42] This was the beginning of percutaneous cerebral (carotid) catheter angiography, and it is significant that Jefferson residents took the initiative in originating this now common procedure.[43] Many years later (1972), Dr. Rollins removed the spinal canal bullet from Alabama Governor George Wallace, following the assassination attempt on his life.

Jaeger's varied accomplishments may be ascribed to his high energy level with self-drive, which also drove others as an intense but reasonable disciplinarian. He was a great believer in precept and personal supervision of his Residents. He probably would have delegated much less had he the time to do things himself. He required much from his Residents, but to them he gave much attention. For several years he required that each Resident manufacture his own headlight before certifying the completion of his Residency. He struggled constantly to influence the institution to fulfill its commitments to him. He did succeed, however, largely because of his Prussian background and persistent, insistent attitude. Such persistence often surfaced in his stubborn perseverance at surgery, intent on cure rather than palliation, an attitude he may well have acquired from Walter Dandy in his months at Johns Hopkins.[44] The humorous, generous, and caring side of his personality surfaced periodically at work and routinely at play.

Dr. Jaeger was responsible for the training of 12 Residents and was involved in the training of nine more after he retired as Divisional Chief in 1961. He remained professionally active until about two days before he died on August 16, 1968.

Many of those outstanding Residents had distinguished subsequent careers. The most

prestigious of these was Tai Joon Moon (Figure 40-3), Resident in neurosurgery from 1954 through 1957 and also fellow in the Department of Neurology at Jefferson in 1957. He graduated from the College of Medicine, Seoul National University, Seoul, Korea, in 1950, received a doctorate in medical science from Nippon University, Japan, in 1960, and was Chairman and Professor of Neurosurgery at Yonsei University, College of Medicine in Seoul from 1958 to 1966. He pioneered neurosurgery in Korea and established the Korean Board of Neurosurgery to supervise training and certification as in the United States. Many of his Residents later became chairmen of neurosurgical departments in other Korean medical colleges. He became President of the Korean Neurosurgical Society, Korean Medical Association (two consecutive terms), and Confederation of the Medical Associations in Asia and Oceania. He became involved in politics and was elected a Senator in the Korean National Assembly for ten years. He introduced the continuing educational program for Korean physicians, founded the medical malpractice insurance program under the Korean Medical Association, and introduced national health insurance for the entire population. He thus had enormous influence upon medical education and upon health care in his own country, to which he returned instead of succumbing to the desire for a medical career in the country of his training. In 1985 he was elected President of the World Medical Association and in 1987 received an honorary degree at Jefferson.

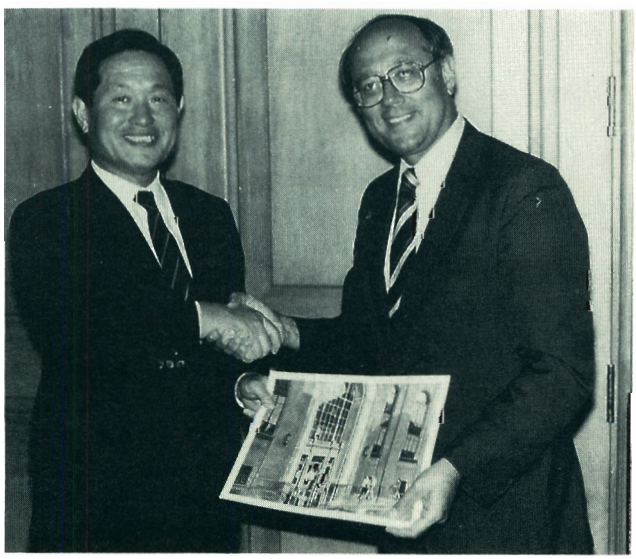

FIG. 40-3. Tai Joon Moon, neurosurgical Resident (1954–1957), shown with Dean Gonnella. Moon was President of the World Medical Association (1985). He received an honorary degree at Jefferson (1987).

Jaeger's major contributions to the neurosurgical field included hydrothermal prefrontal lobotomy, hydrothermal Gasserian ganglionectomy, surgical demonstration of the spinal cord localization as the site of the injury in brachial plexus avulsion, muscle embolization of carotid-cavernous fistula preceded by distal internal carotid ligation (later known as the "Jaeger maneuver"), and discovery of the irritating effects of emulsified, iodized vegetable oils on the brain and spinal cord. It is a significant reflection of his personality that only eight of his 61 papers had coauthors. Just two of his papers dealt with laboratory subjects, which indicated his clinical rather than laboratory orientation. Nevertheless, he knew the importance of research and would have performed more had he had time to do so. As it was, in the mid-1950s he organized, designed, and set up a laboratory in the college building on Walnut Street and appointed David J. LaFia (Jefferson, 1947), staff neurosurgeon and Instructor in Neurosurgery, as Research Associate in charge of the laboratory under the chief's direction. Their investigations and publications included "The Effects of Renografin as a New Contrast Medium for Cerebral Angiography" and "The Effects of Respiratory Airway Obstruction on the Brain During Craniotomy Under Normothermic and Hypothermic Status." Dr. LaFia went on to publish many clinical, scientific, and literary papers and to develop hospital neurosurgical services elsewhere in Philadelphia, Miami, and California.

Dr. Jaeger had a provincial outlook in organizational medicine, despite his Presidency of the United States Chapter of the International College of Surgeons in 1944, a position he resigned because he could not tolerate the aggressive interference of Dr. Max Thorek, a founder of the International College. This was purposeful, for he believed he should not dissipate his energies at the national level. Thus, he conceived of the Philadelphia Neurosurgical Society, which he formed in 1958 with the help and cooperation of the other academic chiefs of

neurosurgery in Philadelphia, namely Robert Groff of the University of Pennsylvania, Axel Olsen of Hahnemann Medical College, and especially Michael Scott (Jefferson, 1932) of Temple University.[45] This society included neurosurgeons not only from Philadelphia but throughout Pennsylvania, New Jersey, Delaware, Maryland, and Washington, D.C. The name was changed to the Mid-Atlantic Neurosurgical Society in 1967. Although its patron saint was Charles Harrison Frazier, it owed its existence to J. Rudolph Jaeger.

During the Jaeger years other staff members at Jefferson included Drs. Stacy L. Rollins, Jr. (Jefferson, J1944), Joseph A. Brady, and Henry Keen Shoemaker (Jefferson, 1949).

The Rovit Years (1961–1965)

Jaeger became 65 in October, 1960, but continued to serve until July 1, 1961, when he was succeeded by Richard L. Rovit (Figure 40-4), who was appointed as Associate Professor of Surgery (Neurosurgery) and Head of the Division of Neurological Surgery. Dr. Rovit was born in 1924, received his undergraduate education at the University of Michigan, and obtained his M.D. from Jefferson in 1950. His postgraduate training in neurosurgery and allied disciplines was in Boston (Beth Israel Hospital, Massachusetts General Hospital, and The Lahey Clinic), in London (The National Hospital, Queens Square), and in Montreal (The Montreal Neurological Institute). Before coming to Jefferson he had research and teaching fellowships at Harvard Medical School and McGill University Medical School and was on the staff of the Montreal Neurological Institute as Assistant Neurosurgeon (1960–1961). During his tenure at Jefferson there was a partial shift from a primarily clinical and technical emphasis to a more academic and research approach. The residency training program was modestly revised in those directions. The Residents were successfully assigned to writing scientific papers as their time permitted. Of the 18 papers produced by Dr. Rovit during or related to his Jefferson years, four were coauthored with Residents. Into 1984 he had written 108 papers, mostly clinical in nature and varied in scope.

Dr. Rovit resigned from Jefferson July 15, 1966, to become Chairman of the Department of Neurological Surgery at Saint Vincent's Hospital and Medical Center in New York City and Professor (1970) of Clinical Neurosurgery at New York University School of Medicine. He became distinguished at local and national levels in clinical, academic, and organizational neurosurgical affairs.

Rovit was instrumental in bringing Dr. Nicholas T. Zervas to Jefferson in 1962. Zervas was born in 1929, received his A.B. from Harvard, and obtained his M.D. from the University of Chicago School of Medicine. He trained at Montreal Neurological Institute, Massachusetts General Hospital, and the University of Paris in

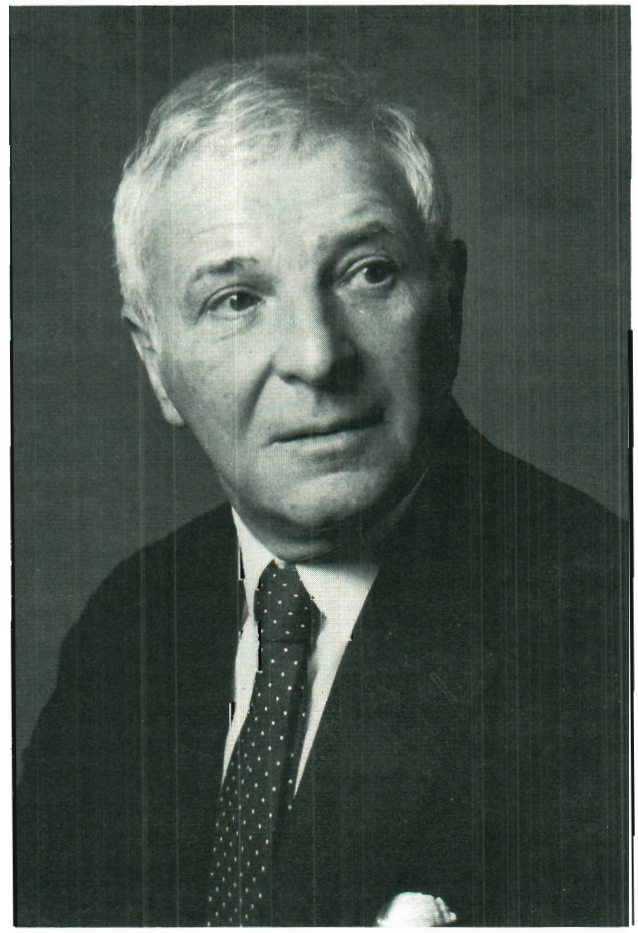

FIG. 40-4. Richard L. Rovit, M.D., Head of the Division of Neurosurgery (1961–1965).

stereotactic cerebral surgery under Dr. Jean Talairach. He came to Jefferson as Associate in Neurosurgery and later became Assistant Professor of Surgery (Neurosurgery). His chief interests were in stereotactic research and surgery as applied to destructive lesions in the thalamus and particularly the cerebellum for movement disorders, and also in thermal, radiofrequency hypophysectomy for breast cancer and diabetic retinopathy. It is of historic interest that these highly successful procedures were eventually supplanted by medical management. Of Zervas's more than 175 scientific papers and abstracts of mixed laboratory and clinical nature, 12 were during or related to his years at Jefferson. He resigned in December, 1967, to become Chief of the Neurosurgical Service at Beth Israel Hospital and Assistant Professor of Surgery (Neurosurgery) at Harvard Medical School. In 1977 he became Chief of the Neurosurgical Service at Massachusetts General Hospital and Professor of Surgery at Harvard Medical School.

The Gordy Years (1965–1973); The Division Under Gordy

Philip D. Gordy (Figure 40-5) was appointed in September, 1965, as Professor of Surgery (Neurosurgery) and Head of that Division of the Department of Surgery. He was born in Southhampton, Pennsylvania, in 1918, and received his A.B. from the University of Michigan and M.D. from its medical school. He trained at New York Hospital and at the University of Michigan. Immediately in 1949 he entered the private practice of neurosurgery in Wilmington, Delaware, until 1962. He then joined the Department of Neurological Surgery at the University of Oregon Medical School, becoming Professor there in 1964. He was a founding member of the Congress of Neurological Surgeons and eventually its President in 1959.

After his arrival Dr. Gordy proceeded to transfer the Division to very large and renovated quarters, formerly occupied by the Department of Pathology on the fifth floor of the Medical College building on Walnut Street. This provided several private offices, a large meeting room, and ample, expanded laboratory space. Laboratory activities, however, were temporarily suspended following Dr. Zervas's departure pending successful acquisition of a research scientist to continue in this area. Twelve Residents were involved in the well-balanced training program during the Gordy years. He enhanced this program by improving communications at the national accrediting level, intensifying the journal club, instigating monthly morbidity/mortality conferences, establishing a joint training venture with the Department of Neurology, and, in particular, creating a teaching affiliation with Wilmington Medical Center. This provided an additional 1,000 beds for residency training and greatly improved Jefferson's accreditation position so that two new Residents were approved for each

FIG. 40-5. Philip D. Gordy, M.D., Professor of Neurosurgery (1965–1969); Chairman of the Department of Neurosurgery (1969–1973).

year. This affiliation began July 1, 1970, and lasted for 14 pleasant and rewarding years until the accrediting board forced its dissolution on June 30, 1984, because it no longer satisfied more stringent requirements.

There continued to be vigorous teaching of third- and fourth-year medical students during the Gordy years at didactic, bedside, seminar, journal club, and conference levels at Jefferson and affiliated hospitals, including clinical neurosurgery, neurosurgical pathology, and neurophysiology.

Seven neurosurgeons were added to the staff, mostly for teaching purposes at Jefferson or its affiliates: Samuel S. Lyness (Bryn Mawr Hospital), Robert K. Jones and Howard A. Richter (Lankenau Hospital), David A. Yazdan (Jefferson), Livio Olmedo and Martin Gibbs (Wilmington Medical Center), and Harold B. Vogel (Jefferson). In 1974 Harold Haft was appointed from Methodist Hospital and Delaware County Memorial Hospital.

The Division continued to be busy clinically and the Wills Eye neurology affiliation provided a large source of surgical neuro-ophthalmological problems. An operating microscope was obtained soon after microneurosurgery was introduced and this greatly enhanced surgical techniques and teaching.

Stereotactic radiofrequency hypophysectomy continued for diabetic retinopathy and for breast or prostatic cancer. Radiofrequency Gasserian ganglionectomy was begun. Contributions continued to be made to the literature on a variety of clinical topics.

The Neurosurgery Department Established (1969)

One of Dr. Gordy's outstanding accomplishments was the creation of a separate Department of Neurosurgery, converting from its Divisional status in the Department of Surgery on July 1, 1969. This autonomy greatly facilitated Departmental administration, residency training, and budgetary matters.

Another contribution by Gordy was his inauguration of citywide "Grand Rounds," monthly meetings of all the teaching neurosurgical services in Philadelphia for presentations of clinical cases of unusual interest. These meetings were hosted by the various schools, providing a forum for more broad-based discussion of problems and augmenting relationships between the five schools of medicine and their neurosurgeons. Unfortunately, this program ceased after a year or so, probably because of the multiplicity of meetings and obligations.

Harold B. Vogel arrived from the University of Utah College of Medicine on August 25, 1971, to reestablish and direct the laboratory, and was formally appointed Assistant Professor of Neurosurgery on April 3, 1972. He was born in Baltimore in 1932, received his B.A. from Emory University, his M.D. from the Medical College of Virginia, and trained at Albany Medical Center Hospital. Dr. Vogel was interested in brain tumor antigens and proceeded to investigate these by heterotransplantation of normal tissue and human brain tumors on chick chorioallantoic membrane. The focus later shifted to brain tumor tissue cultures after he brought in Debdas Mukerjee, Ph.D., from the M.D. Anderson Hospital in Houston, Texas, as Research Associate Professor. Mukerjee continued his investigations of the viral transformation of fibroblasts. The effect of androsterone and estradiol on cell cultures of human meningiomas was also studied. A.R. Vasantha Kumar, who had trained at the University of California and the University of Vermont, was appointed in 1973 as Clinical Assistant Professor of Neurosurgery. He had studied the effect of procarbazine in the treatment of brain tumors as well as the rate of removal of dead tumor cells from the various body tissues. Another line of investigation, in conjunction with the Department of Neurology, involved the study of spinal cord-evoked potentials in cats and humans in response to a variety of stimulations.

A transitional period occurred when Dr. Gordy requested a leave of absence for reasons of health in January, 1973, to enter private practice in Casper, Wyoming. In 1984 he introduced, developed, and headed a Department of Rehabilitation in the Natrona County Hospital in Casper. Dr. Vogel served as Acting Chairman of the Jefferson Department from June 18, 1973, until August 31, 1974, when he resigned to become Associate Professor in the Division of Neurosurgery at the University of Colorado

Medical School and Chief of Neurosurgery at Denver General Hospital. He continued there in practice and teaching and contributing to the medical literature.

The Osterholm Years (1974–)

Jewell L. Osterholm (Figure 40-6) was appointed Professor and Chairman of the Department of Neurosurgery in October, 1974. He was born in Montana in 1929, attended Montana State University, and received his M.D. from Washington University School of Medicine in 1957. His postgraduate training in neuropathology, neurology, and neurosurgery was at the Montreal Neurologic Institute of McGill University. Immediately thereafter, in 1963, he came to the neurosurgical service at Hahnemann Medical College under Axel Olsen. In 1967 he became Director of the Division of Neurological Surgery there, and soon became Director of the new residency training program, spinal cord injury center, and neurosurgical research laboratories. He came to Jefferson as an experienced administrator with an active research program and a large surgical practice. An efficient administrative organization was promptly established. Departmental offices, conference rooms, and laboratory facilities were all radically renovated and a Departmental library begun and constantly expanded.

FIG. 40-6. Jewell L. Osterholm, M.D., Chairman of the Department of Neurosurgery (1974–).

Except for a few lectures, the medical student teaching of neurosurgery was abruptly curtailed in June, 1975. It no longer had a core status in the curriculum, and few chose it as an elective in the clinical years. This lack of student exposure to such an important diagnostic and therapeutic discipline in the understanding and management of nervous system diseases was naturally deplored.

On the other hand, residency training greatly accelerated and improved. The number of positions rose to six and as high as eight in 1981–1982. By 1980–1981 the Jefferson/Wilmington program provided more than 1,300 major neurosurgical operations yearly. The disappointment was deep when this relationship had to be terminated in 1984. Although the training program was not crippled in view of the progressively large increase in numbers of both patients and major surgical procedures at Jefferson, there remained optimism about restructuring and resuming the affiliation. By 1983–1984 there were more than 50 applications for each residency position offered yearly. Residency training in both Neurosurgery and Neurology was enhanced, starting in 1982, when an admitting arrangement was developed between these two Departments to provide wider sharing of neurosurgical patients and a more broad-based diagnostic workup. Neurosurgical residents became involved with ancillary disciplines such as the basic neurosciences, neuroradiology, neuropathology, pediatric neurosurgery, medical isotopic diagnosis, electrodiagnosis, and the neurosurgical

laboratories. With regard to neuroradiology, a decided change had gradually occurred nationally in the 1970s as this activity, except for some myelography, progressively passed from the hands of neurosurgeons to radiologists. Resident attendance at various local and national conferences became routine. A microneurosurgical laboratory was installed to provide facility in that skill. Board-certification success remained excellent among the Residents.

In the area of patient care, the most modern methods of neurosurgical therapy became routine: very sophisticated monitoring and care in the neurointensive care unit; both radiofrequency rhizotomy and implantation of morphine pumps for intractable pain; television monitoring in surgery as a technical and teaching adjunct; expansion in the use of microsurgery for aneurysms, cranial nerve lesions, transphenoidal pituitary procedures, and spinal cord or intervertebral disc surgery; laser surgery; combined neurosurgery/ear, nose, and throat procedures; extra-intracranial vascular bypass surgery in conjunction with electroencephalogram monitoring and regional blood flow studies; and combined neurosurgical/orthopedic spinal surgery.

This last discipline was an outgrowth of the Regional Spinal Cord Injury Center of Delaware Valley, which was established at Jefferson by the Department of Health, Education and Welfare in October, 1978 (opening on January 1, 1979) under the aegis of the Department of Rehabilitation Medicine in conjunction with the Departments of Neurosurgery and Orthopedic Surgery. In 1983–1984 more than 50% of the neurosurgical service census consisted of spinal cord injury patients and more than 100 such acute patients were admitted to the service yearly.

The progressive intensity of clinical and teaching activity demanded an expansion of the Departmental staff. Lucas Martinez trained in neurosurgery at Hahnemann Medical College and served as a staff neurosurgeon at Jefferson from 1976 to 1980. Bruce E. Northrup came to Jefferson in 1978 as Assistant Professor of Neurosurgery. He was born in Ohio in 1938, was educated at Amherst College and Ohio State University, and received his M.D. from the latter. He trained in neurosurgery at the Johns Hopkins Hospital and came from the University of North Dakota School of Medicine to Jefferson. His special interest was in vascular and spinal disorders.

Donald L. Myers was born in Ithaca, New York, in 1951, attended Pennsylvania State University, received his M.D. from Jefferson in 1975, and trained in neurosurgery at Jefferson. He became Clinical Assistant Professor of Neurosurgery and developed a special interest in the management of intractable pain with morphine pump implantation, and with skull base and acoustic neurinoma surgery. Robert M. Cohen finished his training in neurosurgery at Jefferson in 1971 and entered private practice. He was appointed Instructor in Neurosurgery at Jefferson in 1980 and contributed regularly to the teaching program.

An outstanding feature of the Osterholm years was the intense activity in laboratory research, eventually requiring a move to new, expanded quarters in Alumni Hall. In the early years the research Professors, John L. Alderman, Ph.D., and John D. Irvin, M.D., Ph.D. (who for a time was also a neurosurgical resident), and Mr. Richard Moberg conducted research under Dr. Osterholm. They focused mainly on the reactions of the spinal cord to trauma and its histopathologic, metabolic, neurotransmitter, vascular, and electrophysiologic responses. Numerous grants were obtained, presentations made, and papers published in these areas. Research branched out into the fields of neuroanatomy, neurochemistry, neuropharmacology, histofluorescence, radioautography, and regional blood flow. Interdepartmental collaboration involved anatomy, neuropathology, and pharmacology with contributions by the pharmacologists Anthony Triolo, Ph.D., and C. Paul Bianchi, Ph.D. In 1978 Dr. Osterholm published a book entitled *The Pathophysiology of Spinal Cord Trauma.* Subsequently Madhu Kalia, M.D., came on the research staff as Professor of Neurosurgery and pursued her interests in the neurochemical and morphofunctional features of nerve pathways and nuclei.

In 1977–1978 the research emphasis began to shift gradually to the study of stroke and the relief of cerebral ischemia and cellular anoxia by the unique means of extravascular hyperoxygenation through perfusion of the third circulation with a balanced oxygenated fluorocarbon emulsion. Bikash Bose, who completed his neurosurgical residency training at Jefferson in 1984, was

instrumental in establishing a reliable stroke model and in evaluating the effects of the therapeutic perfusion upon regional cerebral ischemia. This project eventually dominated the research program, was well funded, and had most favorable progress. Nine United States patents related to the method were granted to Dr. Osterholm in 1984. In April 1985 he received an award as Inventor of the Year for 1984.

Jefferson, as the birthplace of pioneer neurosurgery in the United States under W.W. Keen, has continued to nurture this rapidly expanding specialty. Increasing momentum in the progressive growth of the Department augurs well for Jefferson's honored position in this field.

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CHAPTER FORTY-ONE

Department of Orthopaedic Surgery

JOHN J. GARTLAND, M.D.

"The broken bone once set together is stronger than ever."

—JOHN LYLY (1554?–1606)

ALTHOUGH PHYSICIAN involvement with disorders of the musculoskeletal system dates back to medical antiquity, the specialty of orthopaedic surgery was not designated as such until just 83 years before the founding of Jefferson Medical College. Before this formal naming occurred and allowed a specific focus to begin, disorders and injuries of the musculoskeletal system were cared for by that large group of practitioners known simply as surgeons. It is noteworthy that as orthopaedic surgery struggled for its separate identity and began to disassemble from general surgery, Jefferson became one of the first medical schools in the country to recognize the new specialty by founding a Department of Orthopaedic Surgery in 1904.

The term *orthopaedics* was coined in 1741 by Nicholas André, Dean of the Faculty of Medicine of the College de France. He combined two Greek words *orthos*, meaning straight or free of deformity and *paidios*, a child. It called attention to his belief that the prevention of deformed adults lay in the development of straight children. André had no idea that this newly invented word would be later adopted to identify the important medical discipline that concerns itself with the disorders and injuries affecting the musculoskeletal system.

Gradual acceptance of the new term sharpened the focus among those mechanically minded general surgeons of the time who had developed a special interest in the musculoskeletal system. A few of them founded the American Orthopaedic Association in 1887, the first formal orthopaedic organization in the world. Their vision and sense of purpose can be better appreciated when it is noted that the founding of this Association predated the founding of the American College of Surgeons by 26 years.

World War I, with its large volume of musculoskeletal injuries, provided the catalyst for the ultimate emergence of this special field from beneath the mantle of general surgery. By 1935 the American Board of Orthopaedic Surgery had been formed and the American Academy of Orthopaedic Surgeons established. This second national orthopaedic organization was needed to give an organizational home to the hundreds of

emerging board-certified orthopaedic surgeons not eligible for membership in the American Orthopaedic Association. The latter organization continued to restrict its membership and be professor-oriented. By 1985 the American Academy of Orthopaedic Surgeons had become the largest orthopaedic organization in the world, with a membership in excess of 11,000 board-certified orthopaedists.

Samuel D. Gross was outstanding in the early American literature relating to the later specialty of orthopaedics. At age 25 and only two years after his graduation from Jefferson in 1828, he published *Anatomy, Physiology and Diseases of Bones and Joints* (1830). This octavo volume of 382 pages sold 2,000 copies in fewer than four years. In 1859 when he was Professor of Surgery at Jefferson, Volume II of his *System of Surgery* contained 253 pages devoted to bone and joint disease, including fractures. Additionally, Eakins' *Gross Clinic,* painted in 1875, depicted Gross removing a sequestrum from the femur.

As early as 1839 Thomas Dent Mütter, Professor of Surgery at Jefferson (1841–1856), published a monograph of 104 pages on clubfoot. In his textbook of *Operations of Surgery* (1846) he devoted four out of 19 chapters to amputations, injuries of muscles and tendons, contractions of the leg and thigh, ankylosis, and clubfoot. Joseph Pancoast, Professor of Surgery from 1839 to 1841 and of Anatomy from 1841 to 1874, wrote extensively on operations for diseases of the bones and joints in his *Operative Surgery* (1844).

The development of orthopaedic surgery at Jefferson closely paralleled the development of the specialty in the country as a whole. Traditionally, formal emergence of the term *orthopaedic surgery* in the curricula and on the faculties of most medical schools can be traced to the identification of a general surgeon with a mechanical turn of mind who evinced interest in disorders of bones and joints. The first such person at Jefferson (after Gross, Mütter, and Pancoast) was Dr. Oscar Huntington Allis, an 1866 graduate of Jefferson (Figure 41-1).

Oscar H. Allis, M.D. (1836–1921); Clinical Lecturer in Orthopaedic Surgery (1888–1891)

Oscar Allis had a great interest in problems of a mechanical nature and devised the Allis forceps, which remains a widely used surgical instrument today. He practiced general surgery in many Philadelphia hospitals and, for a period of about ten years, was a member of the Department of Surgery at Jefferson Hospital. He began giving lectures on orthopaedic surgery at Jefferson, in response to his own interest, during 1879. This interest was formally recognized when he was named Clinical Lecturer of Orthopaedic Surgery in 1888. These lectures were given during the summer courses while he was working in surgery with the younger Gross. He is generally credited with organizing the orthopaedic outpatient clinic at Jefferson in the 1877 Hospital. He focused attention on the mechanical problems encountered

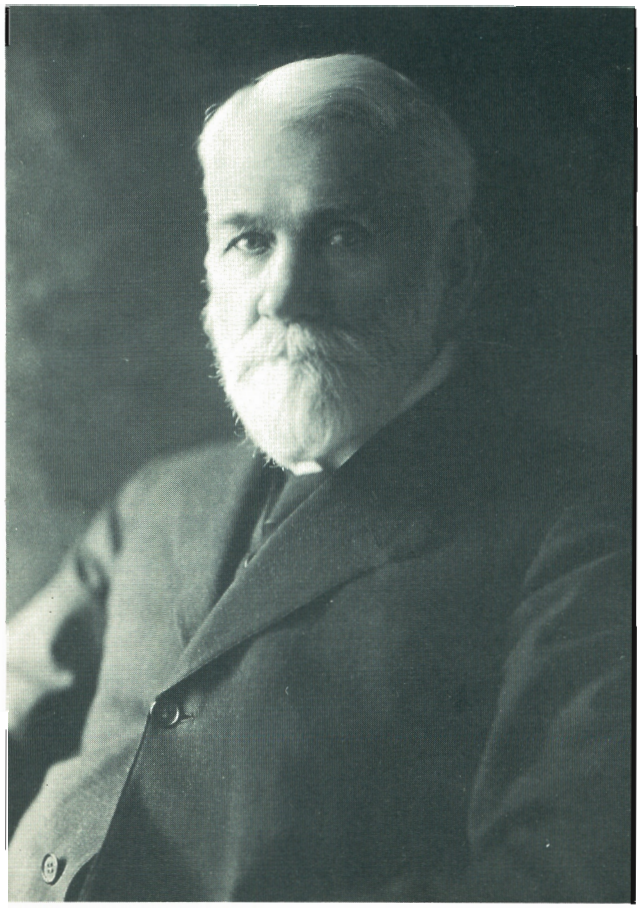

FIG. 41-1. Oscar H. Allis, M.D., Clinical Lecturer in Orthopaedic Surgery (1888–1891).

in surgery, thus preparing the environment for the eventual establishment of a separate Department of Orthopaedic Surgery. He continued to be involved with Jefferson's early interest in orthopaedics until he resigned from the faculty in 1891.

Allis was widely regarded as an authority on fractures and dislocations during his lifetime. He was awarded the Gross Prize of the Philadelphia Academy of Surgery in 1895 for his monograph on *Obstacles to the Reduction of Dislocation of the Hip*. Just before his death in 1921, he completed a work, illustrated with a model, demonstrating the functions of the spinal column with its musculature. He used this device to call attention to the effect of posture on normal spinal curvature and the bad effect of faulty posture. His biographer in *American Medical Biographies* published in 1928 said of Allis: "He shone rather as an investigator of surgical problems and a deviser of useful surgical instruments than as an operator. While he was a man of the finest character, universally respected and trusted, yet he was somewhat dour and set in his opinions."[1] In spite of his early association with orthopaedics at Jefferson, Oscar Allis regarded himself at all times as a general surgeon, and his organizational memberships reflected that distinction. When he left Jefferson, the position of Clinical Lecturer in Orthopaedic Surgery was given to H. Augustus Wilson, an 1879 graduate of Jefferson (Figure 41-2).

H. Augustus Wilson M.D. (1853–1919); Clinical Lecturer in Orthopaedic Surgery (1892–1904) and First Chairman (1904–1918)

Augustus Wilson was promoted to Clinical Professor of Orthopaedic Surgery in 1892. It would seem appropriate to regard this promotion as the exact point in Jefferson history when orthopaedics began the process of ultimate separation from general surgery. Support for this contention comes from Wilson's attitude, since he clearly regarded himself as an orthopaedic surgeon rather than a general surgeon. As early as 1887, he had published an article in the *Proceedings of the Philadelphia County Medical Society* that described a new method for preparing dry gypsum bandages used in the construction of plaster casts.[2] He was invited to join the fledgling American Orthopaedic Association in 1891 and was well regarded by his colleagues in this new organization. He served as Vice President in 1893 and President in 1902. He represented the first Jefferson orthopaedist to hold a major elected office in national orthopaedics. A Jefferson representative was not destined to secure a second major national orthopaedic office until 1979.

A significant reorganization of the Jefferson faculty occurred in 1904. Several disciplines, formerly regarded as part of general surgery, were identified as new and separate Departments. The minutes of the Administrative Committee meeting

FIG. 41-2. H. Augustus Wilson, M.D., Clinical Professor of Orthopaedic Surgery (1892–1904), and First Chairman (1904–1918).

of November 28, 1904 (forerunner of the Executive Council) state "in view of the fact that the faculty is now composed of Professors who teach and examine in genito-urinary surgery, orthopaedic surgery and laryngology, it is suggested that the Professor of Practice of Surgery and of Clinical Surgery shall be relieved of teaching subjects pertaining to these branches."[3]

Minutes of the Administrative Committee meetings before 1904 do not exist, so one can only guess the reasons for this faculty reorganization. It is probably accurate to surmise that a need was identified to enlarge the major faculty. An interesting question to consider is why Jefferson chose, in 1904, to decrease the responsibility of the Department of Surgery by creating three new Departments out of the fields that were traditionally considered surgical subspecialties. In many, if not most, medical schools, these evolving surgical disciplines were given some separate identity by simply designating them Divisions of General Surgery.

Whatever the reasons happened to be, this action of the Administrative Committee created a Department of Orthopaedic Surgery at Jefferson in 1904 and made H. Augustus Wilson its first Professor and Chairman. Jefferson thus became one of the first medical schools in the country to have a separate Department of Orthopaedic Surgery. It is somewhat ironic to note that despite the suggestion of the Administrative Committee that the Professor of Practice of Surgery and of Clinical Surgery "be relieved of teaching subjects pertaining to these branches," the Department of Surgery continued to dominate the treatment of fractures in Jefferson Hospital and continued to teach fracture principles to Jefferson medical students until about 1948.

Wilson, by all accounts, was a good teacher and an effective Department Chairman. He appointed J. Torrence Rugh (Jefferson, 1892) to serve as Assistant Professor of Orthopaedic Surgery in 1905 and Arthur J. Davidson (Figure 41-3) (Jefferson, 1907) as Instructor of Orthopaedic Surgery in 1908. Both of these men figured prominently in the growth and development of the new Department. Treatment of orthopaedic deformities at this time was given mostly by physical manipulation, mechanical traction devices, and bracing. Not much in the way of open surgery was performed except by a few daring pioneers. References to surgical correction of deformity in the years around 1910 generally referred to the cutting of tight tendons performed through very small incisions. Rugh ultimately succeeded Wilson as Chairman in 1918, and Davidson remained in active teaching in the outpatient clinic until 1954. Arthur Davidson became a recognized expert in the care of foot problems and freely imparted his knowledge to students in the orthopaedic clinic. Unfortunately, he could never be persuaded to put his considerable knowledge into book form.

Writing in the 1936 *Clinic Yearbook,* Rugh made the following comments about these early years of orthopaedics at Jefferson:

> "The outpatient clinic was organized by Dr. Allis and now forms an important part of the student's

FIG. 41-3. Arthur J. Davidson, M.D., Associate Professor of Orthopaedic Surgery, was especially interested in foot problems.

instruction. The first dispensary was in the amphitheater of the old hospital. Dr. James Manno of the class of 1887 was chief of clinic and cooperated with Professor Wilson until 1896 when he resigned to accept the orthopaedic professorship in the Medico-Chirugical College. During these years of Dr. Wilson's service, great advances were made in orthopaedics. The surgical phases of the corrective work increased and became more important. New procedures and discoveries regarding the prevention and correction of deformities added greatly to the success of the work in Jefferson."[4]

Professor Wilson resigned the Chairmanship in 1918 and died of uremia on April 16, 1919. He had attained a national reputation in orthopaedic surgery that reflected favorably on Jefferson and its new Department. His obituary was published in 1919 in the *Journal of Orthopaedic Surgery,* forerunner of the present *Journal of Bone and Joint Surgery*. Its author, Dr. R.W. Lovett of Boston, said: "I should say that the man's chief characteristics were earnestness, unselfishness, kind-heartedness and absolute devotion to a cause once undertaken. He was a man of ideas which he never sacrificed, his profession and his family filled his life, and he had few outside interests. He was a most indomitable worker and he had one agreeable trait, that of making the man with whom he talked think more highly of himself than he did before the conversation, for he seemed to look for the best that was in each man and to dwell on that side of his relation to each one."[5]

James T. Rugh, M.D. (1867–1942); Second Chairman (1918–1930) and First James Edwards Professor (1930–1939)

James Torrence Rugh (Jefferson, 1892) succeeded Wilson as Professor of Orthopaedic Surgery in 1918 (Figure 41-4). At the time of his appointment Rugh was on active duty with the Army Medical Corps and did not return to Jefferson until 1919. Originally appointed to the Orthopaedic faculty by Wilson in 1905, Rugh brought extensive clinical experience to the Professorship. He had been the first orthopaedic surgeon appointed to the Methodist Hospital in 1905. He was appointed to the orthopaedic staff of Philadelphia General Hospital in 1912 and in 1914 became Clinical Professor of Orthopaedic Surgery at the Woman's Medical College of Pennsylvania. At one time he was consulting orthopaedic surgeon to six Philadelphia-area hospitals. In addition to these obligations, Rugh worked closely with Wilson at Jefferson during the period 1905 to 1918.

Rugh had gained valuable experience with the surgical treatment of battle casualties during World War I. He rapidly applied these surgical lessons to patient problems at Jefferson. During Rugh's term as Department Chairman the treatment of orthopaedic disabilities gradually shifted from the mechanical methods used by his predecessors to modern open surgical correction. Between 1920

FIG. 41-4. James T. Rugh, M.D., Second Chairman (1918–1939) and First James Edwards Professor (1930–1939).

and 1930, Rugh operated several times at Jefferson on a young boy to correct severe bilateral clubfoot deformity. As fate would have it, this same young patient would grow up to become Chairman of the Department of Orthopaedic Surgery in 1970.

J. Torrence Rugh was an open charismatic man, greatly admired by his colleagues, students, and patients. The Class of 1934 presented his portrait to the Medical College. In making the presentation the students said: "To the students on the benches, Dr. Rugh presents his thoughts with clearness, simplicity and a forceful manner so desirable in teaching and his clinical demonstrations afford a lasting visualization of the principle he sets forth."[6]

Rugh was assisted in his work at Jefferson by Arthur J. Davidson (Jefferson, 1907), an Associate Professor, and James R. Martin (Jefferson, 1910) as Assistant Professor. Martin had served as Chief Resident Physician in Jefferson Hospital before joining the Department of Orthopaedic Surgery. For many years he functioned as Rugh's assistant in the private practice of orthopaedic surgery.

In 1930 the Chair of Orthopaedic Surgery was endowed by a gift of $100,000 in memory of James Edwards, a manufacturer of children's shoes in Philadelphia. Rugh became the first James Edwards Professor of Orthopaedic Surgery and, since 1930, each succeeding Department Chairman has received that title.

An associate of the time described Rugh in these words: "Dr. Rugh is a hard-working, democratic man, strongly conservative by nature, temperate in his habits, always kindly, pleasant and optimistic and with a keen sense of humor. As a teacher, he is practical and straightforward, strongly reliant upon experience and his presentations are clear and concise. He is revered by his staff and associates and beloved by his patients."[7]

Rugh was a frequent contributor to the orthopaedic literature and was well regarded nationally. He was a member of both the American Orthopaedic Association and the American Academy of Orthopaedic Surgeons. He served as Vice President of the American Orthopaedic Association in 1917 and again in 1929. During his time as Chairman both the Thompson Annex and Curtis Clinic buildings were opened. The orthopaedic patient load increased, and the corrective work carried out in the hospital and outpatient clinic developed to a high degree of efficiency. Rugh retired as Chairman in 1939 at the age of 72 years and was succeeded by Dr. James R. Martin. He died in 1942.

James R. Martin, M.D. (1886–1956); Third Chairman and Second James Edwards Professor (1939–1950)

James Martin (Figure 41-5) became a member of the orthopaedic department in 1913 and served originally as Rugh's assistant in private practice. He received several promotions within the Department leading to Assistant Professor and

FIG. 41-5. James R. Martin, M.D., Third Chairman and Second James Edwards Professor (1939–1950).

Chief of the Outpatient Clinic by 1938. In that year he resigned to accept appointments as Chief Surgeon at the State Hospital for Crippled Children at Elizabethtown, Pennsylvania, and Director of the Social Security Programs for Crippled Children in Pennsylvania. He was called back to Jefferson in 1939 to become the second James Edwards Professor of Orthopaedic Surgery. In accord with his deep interest in the care of the handicapped child, Martin initiated an association between Jefferson and the State Hospital for Crippled Children. Now known as the Elizabethtown Hospital for Children and Youth, the association begun by Martin has continued to this day. Some Jefferson orthopaedic faculty members still function as active consultants to that institution and some Jefferson orthopaedic Residents receive a part of their education and experience in children's orthopaedics there.

Martin was assisted in his teaching and clinical duties by Drs. Arthur J. Davidson, M. Thomas Horovitz, and Ralph C. Hand. In addition to his duties at Jefferson, Dr. Hand functioned as orthopaedic consultant to Saint Edmund's Home for Crippled Children, now located in Rosemont, Pennsylvania. The association between Jefferson and St. Edmund's Home continued with Dr. John J. Dowling (Jefferson, 1947) assuming the consultant role on Dr. Hand's retirement in 1961. Thomas Horovitz was a bright, energetic orthopaedic surgeon whom many at Jefferson considered to be of professorial caliber. He contributed many fine papers to the orthopaedic literature while in Philadelphia. Unfortunately, Horovitz chose not to return to Philadelphia upon his discharge from World War II service. He relocated in Indianapolis, where he eventually became a full Professor at the University of Indiana Medical School.

James Martin lacked J. Torrence Rugh's background and skill in operative orthopaedics. As a consequence, some of the excitement and forward motion generated clinically by Rugh's introduction of new surgical techniques slowed perceptibly. Davidson and Hand were of the old school and not well versed or comfortable with the new surgical techniques. With Horovitz's decision not to return to Jefferson, none of the remaining orthopaedic faculty had either the skill or the inclination to pursue surgical correction of physical deformities. Gradually, some of the former mechanical treatment methods discarded by Rugh were reintroduced by Martin (Figure 41-6). This reversal occurred at a time when national interest in the surgical correction of physical deformities was in the ascendancy. As a consequence, the students sensed the subtle change, and interest in orthopaedics among students and hospital interns waned.

Martin was a kind and friendly man, dignified, retiring, and unobtrusive. He was quite content with his work and teaching at Jefferson and shunned the national scene. He was a member of the American Academy of Orthopaedic Surgeons but was never invited to join the American Orthopaedic Association. As a consequence of his totally local presence, orthopaedics at Jefferson lost most of the national prominence it had gained under Wilson and Rugh.

The major accomplishment during Martin's Chairmanship was the establishment of the orthopaedic resident education program. It began modestly in 1946 with two Residents appointed yearly and two hospitals, Jefferson and the State Hospital for Crippled Children at Elizabethtown, involved in the clinical experience. Thomas S. Armstrong (Jefferson, 1941) was the first Resident to complete the new program, and he subsequently practiced orthopaedic surgery for many years in Carlisle, Pennsylvania.

By 1945 it had become apparent to faculty leaders at Jefferson that orthopaedic surgery was a Department in a relatively stagnant state compared to other medical schools. A quiet search for an exciting, vigorous figure in orthopaedic surgery led them to the Philadelphia Naval Hospital, where Anthony F. DePalma (Jefferson, 1929), completing the final months of his service commitment, had compiled an enviable surgical record. He was induced in 1946 to come to Jefferson to establish a practice with the understanding he would eventually follow Martin as Department Chairman.

Although Martin continued to function as Department Chairman, DePalma's dynamic, driving style soon stamped him as the leader in everything but name only. James Martin served as President of the Alumni Association in 1948 and formally retired as Chairman in 1950. He then was appointed Associate Dean of Jefferson Medical College and served in this post until his death in 1956. This loyal and devoted Jeffersonian provided

funds in his will for the James R. Martin Nurses' Residence, which was built on the southeast corner of Eleventh and Walnut Streets, where Drs. Thomas Dent Mütter and Samuel D. Gross previously had lived.

Anthony F. DePalma, M.D. (1904–); Fourth Chairman and Third James Edwards Professor (1950–1970)

With Martin's retirement in 1950, Anthony F. DePalma (Figure 41-7) was appointed the third James Edwards Professor and Chairman of the Department. Three essential ingredients were in place that could promise further growth and development for orthopaedic surgery at Jefferson. Wilson had provided Departmental status, Rugh pioneered the surgical emphasis for the specialty, and Martin initiated the Residency program. The appointment of a full-time faculty in orthopaedics, however, was still 20 years away. Drs. Wilson, Rugh, Martin, and DePalma all engaged actively in the private practice of their specialty from off-campus offices. They also did their clinical work in other local hospitals in addition to Jefferson Hospital. They contributed time to Jefferson for teaching and managing the administrative details of the Department.

DePalma soon proved himself to be a forceful teacher and a busy clinical orthopaedic surgeon. He was a skillful surgical technician and his practice eventually grew to huge proportions as his reputation spread beyond the confines of Jefferson. A sense of excitement was returned to orthopaedics by DePalma's surgical experience and dynamic teaching style. The students were

FIG. 41-6. Men's Orthopaedic Ward in Old Main Hospital (ca. 1950).

stimulated, and DePalma influenced many to seek careers in orthopaedic surgery. Many Jefferson students who later held orthopaedic faculty appointments at Jefferson received their graduate orthopaedic education under him. Among the group were Drs. Gerald E. Callery (Jefferson, 1943), John J. Dowling (Jefferson, 1947), Hal E. Snedden (Jefferson, 1950), Jerome M. Cotler (Jefferson, 1952), James M. Hunter (Jefferson, 1953), J. David Hoffman (Jefferson, 1956), Phillip J. Marone (Jefferson, 1957), Richard A. Cautilli (Jefferson, 1958), and John M. Fenlin (Jefferson, 1963).[8] Richard H. Rothman, later destined to become the fifth James Edwards Professor of Orthopaedic Surgery and Chairman of the Department in 1986, completed his orthopaedic residency with DePalma in 1968.

DePalma proved to be a tireless worker both in his own clinical practice and in academic pursuits (Figure 41-8). He was a prolific writer, and his orthopaedic texts are still considered classics. They appeared as follows: *Surgery of the Shoulder* (1950) in three editions; *Diseases of the Knee* (1954); *Degenerative Changes in the Sternoclavicular and Acromioclavicular Joints in Various Decades* (1957); *The Management of Fractures and Dislocations* (1959), in two volumes; and *The Intervertebral Disc,* coauthored with Richard H. Rothman (1970). He also edited *Clinical Orthopaedics,* a series of volumes in symposium form produced under the auspices of the Association of Bone and Joint Surgeons. Because of his constant productivity, Jefferson's national prominence in orthopaedics gradually enlarged.

FIG. 41-7. Anthony F. DePalma, M.D., Fourth Chairman and Third James Edwards Professor (1950–1970)

If DePalma had a weak spot, it was his tendency to be too much of a "one-man show." It was difficult for younger faculty members to develop academically and clinically in this environment at Jefferson during those days, and many left to develop their own services elsewhere. DePalma tended to be somewhat arbitrary and brusque when he believed he was correct on a point. As a consequence he did not enjoy a great personal popularity with the other Philadelphia orthopaedic professors. This attitude also tended to hurt him nationally, where he was regarded with respect but, at the same time, considered somewhat controversial. These mixed reviews from his colleagues undoubtedly played some role in delaying his election to membership in the American Orthopaedic Association until 1965.

During his chairmanship, DePalma established an orthopaedic research laboratory in the space formerly occupied by the Department of Pathology on the fifth floor of the College building. In 1953 he became founding editor of *Clinical Orthopaedics,* a respected series of volumes in symposium form still published eight times yearly by J.B. Lippincott Company. The original editorial office for this publication was a small room in the space occupied by the orthopaedic outpatient clinic on the sixth floor of the Curtis Clinic Building. In 1970 this orthopaedic outpatient clinic space was converted into administrative offices for the Department. From 1970 until 1985, this same small room functioned as the administrative office for the senior orthopaedic resident. DePalma founded the Jefferson Orthopaedic Society in 1960, with membership offered to former residents and all Jefferson

alumni who had elected careers in orthopaedic surgery. The Society has remained active and holds a two-day scientific meeting on the Jefferson campus yearly. It celebrated its twenty-fifth anniversary with a special meeting in Puerto Rico during November, 1984.

It was also during DePalma's tenure as Chairman that Jefferson developed a specific presence in the important orthopaedic subspecialty of hand surgery. After James M. Hunter (Jefferson, 1953) completed his orthopaedic residency under DePalma, he took a one-year fellowship in hand surgery with Dr. Robert E. Carroll at Columbia-Presbyterian Medical Center in New York. He returned to Jefferson and became the first Philadelphia orthopaedic surgeon to confine his practice totally to surgery of the hand. He originally began practice in association with DePalma but later opened his own office. He was joined by his first associate, Dr. Lawrence H. Schneider, in 1969. As noted previously, Jefferson had no full-time orthopaedic faculty as yet, and all members supported themselves by a private practice conducted in outside offices. From the outset, Hunter (Figure 41-9) was considered Jefferson's hand surgeon, and he responded by keeping his office close to the Jefferson campus and by doing almost all of his surgical work in Jefferson Hospital. Hunter was a hard worker and innovative researcher in both the basic and clinical spheres. His research led, ultimately, to the development of the "Hunter tendon" in 1965, the

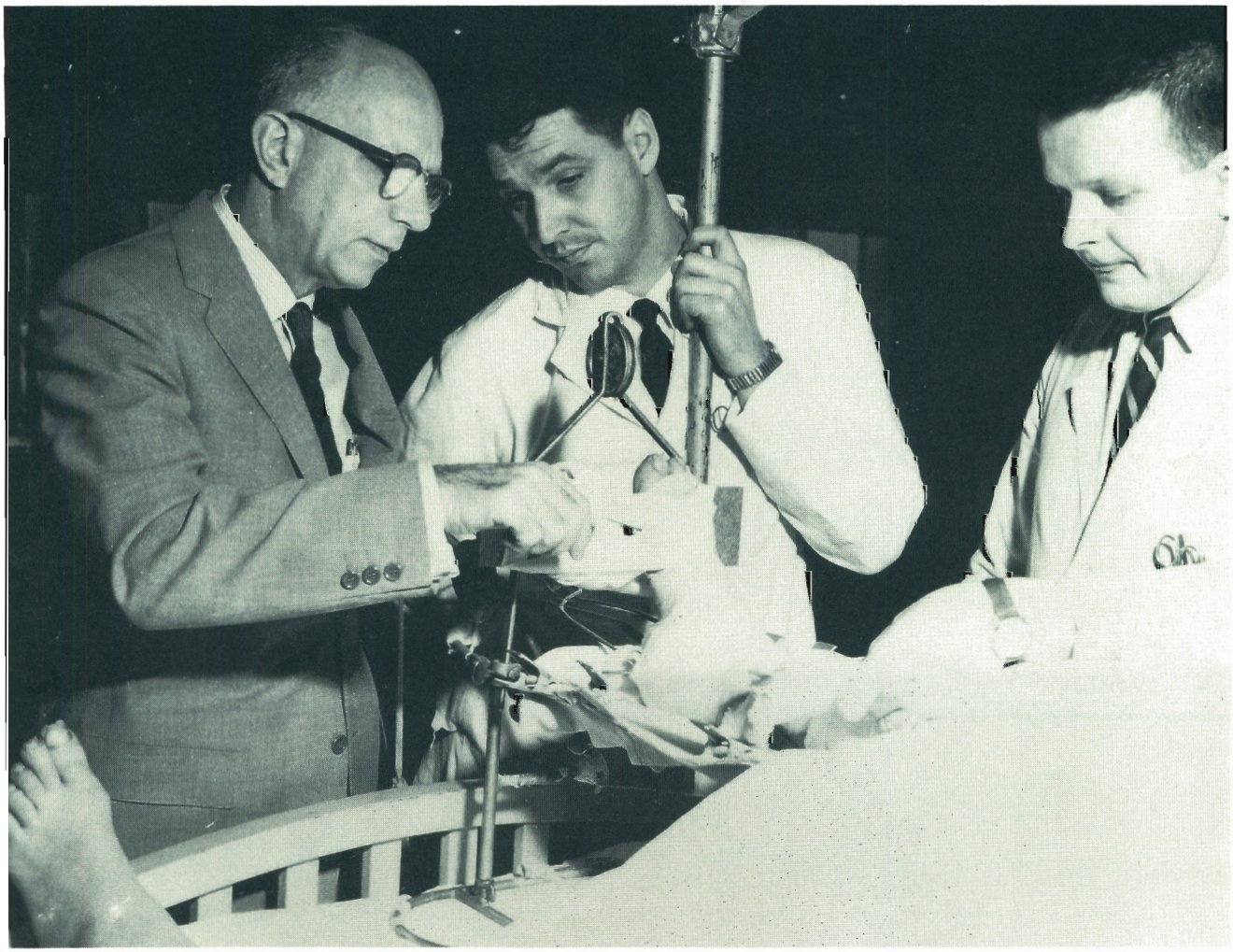

FIG. 41-8. Dr. DePalma instructing in the ward.

first successful artificial tendon for use in reconstructing severely damaged hands.

Hunter's reputation as a hand surgeon grew over the years, progressing from a local to an international stature. In 1978 he coauthored *Rehabilitation of the Hand* with Lawrence H. Schneider, M.D., Evelyn J. Mackin, L.P.T., and Judith A. Bell, O.T.R. A second edition with additional collaborators appeared in 1984. His clinical load grew proportionately, requiring him progressively to increase his professional and support staff. By 1985 this group totalled four hand surgeons, four hand fellows and a support staff of approximately 50 persons, all housed in a building at Ninth and Walnut Streets known as the Hand Rehabilitation Center. Although hand surgery at Jefferson began and remains an essentially private practice, this group officially accepted the designation of Division of Hand Surgery of the Department of Orthopaedic Surgery when the Department was later reorganized by Dr. John J. Gartland, the fourth James Edwards Professor. This reorganization gave administrative structure to hand surgery and allowed participation in the organized educational programs of the Department without forcing a change in their financial arrangements by acceptance of full-time status within the Department.

FIG. 41-9. James M. Hunter, M.D., Professor of Orthopaedic Surgery, who developed the first successful artificial tendon for the hand in 1965.

DePalma was the busiest orthopaedic clinician Jefferson ever had or, possibly, ever will have. His clinical practice was enormous, with a huge surgical caseload. As pleasant as this appeared to be to hospital administrators, a price had to be paid. The price was a gradual lessening of the effort put into educational programs for students and residents. Although DePalma tried hard, it was simply impossible for one person to do it all. As a consequence, he delegated much of the responsibility for conducting the educational programs to junior faculty but without giving them authority to make needed changes. At first this seemed to work well, as many young junior faculty appeared stimulated by the challenge to teach. Unfortunately, their enthusiasm waned as they gradually realized there was little chance to develop a clinical practice at Jefferson as long as DePalma remained so busy. He incorporated many of the junior faculty into his office as "Associates" and between 1952 and 1970 there were at least ten such associates. The bulk of responsibility for student teaching fell to Dr. John J. Dowling. He accomplished the assignment so well that the Jefferson Class of 1974 honored him by presenting his portrait to the College. He also served as President of the Alumni Association in 1984.[9]

Between 1950 and 1970 the residency program had been gradually enlarged to a total of 24 Residents basically as a response to the large clinical volume. During this period the hospitals used for resident education in orthopaedics were Jefferson, Philadelphia General, Methodist, and the State Hospital for Crippled Children at Elizabethtown. Unfortunately, the Philadelphia General Hospital was approaching the end of its unique history as a Philadelphia institution, and

orthopaedic attending coverage for the residents was sparse. In 1969 the Residency Review Committee for Orthopaedic Surgery noted the imbalance of the Jefferson program toward service demands as compared to educational commitments and strongly suggested the program be reorganized with a larger educational base.

DePalma was a very active participant in Jefferson affairs and chaired many important faculty and medical staff committees. He served as President of the Alumni Association in 1959.[10] He made many lasting and significant contributions to the growth and development of orthopaedic surgery at Jefferson. Although intangible, perhaps, his most important contribution was a legacy of Departmental strength, vitality, and professionalism. He inherited a Department that was admittedly weak in staff members, clinical volume, and faculty influence. His tireless energy and enthusiasm achieved an enlarged clinical volume, enhanced the teaching programs, and commanded faculty respect. He retired as Chairman in 1970 and was followed by Dr. John J. Gartland (Jefferson, S1944) as the fourth James Edwards Professor. At the time of DePalma's retirement, the Department of Orthopaedic Surgery, although still small by most faculty standards, was generally agreed to be one of the stronger Departments of the institution. The Class of 1962 presented his portrait to the College. In 1975, five years after his retirement as Chairman, Dr. DePalma was awarded Jefferson's Alumni Achievement Award.

John J. Gartland, M.D. (1918–); Fifth Chairman and Fourth James Edwards Professor (1970–1985)

Dr. John J. Gartland (Figure 41-10) joined the Department as an Instructor after completing his orthopaedic residency at the Columbia-Presbyterian Medical Center in 1952. DePalma invited him back to Jefferson to become his first associate in practice. This association lasted only one and a half years because of philosophical differences that developed between them. DePalma was primarily a clinician with a huge practice. Gartland, although he also considered himself a clinician, believed a large overwhelming practice stifled academic achievements and took time away from educational pursuits. Their parting was cordial and Gartland retained his faculty appointment, progressively rising through the ranks to be made Associate Professor in 1968. Like other young orthopaedists who followed him on the faculty, Gartland found it difficult to develop much of a clinical practice of his own at Jefferson during those years and did most of his clinical work at other hospitals. He was an attending orthopaedic surgeon at Fitzgerald Mercy Hospital (1954–1960),

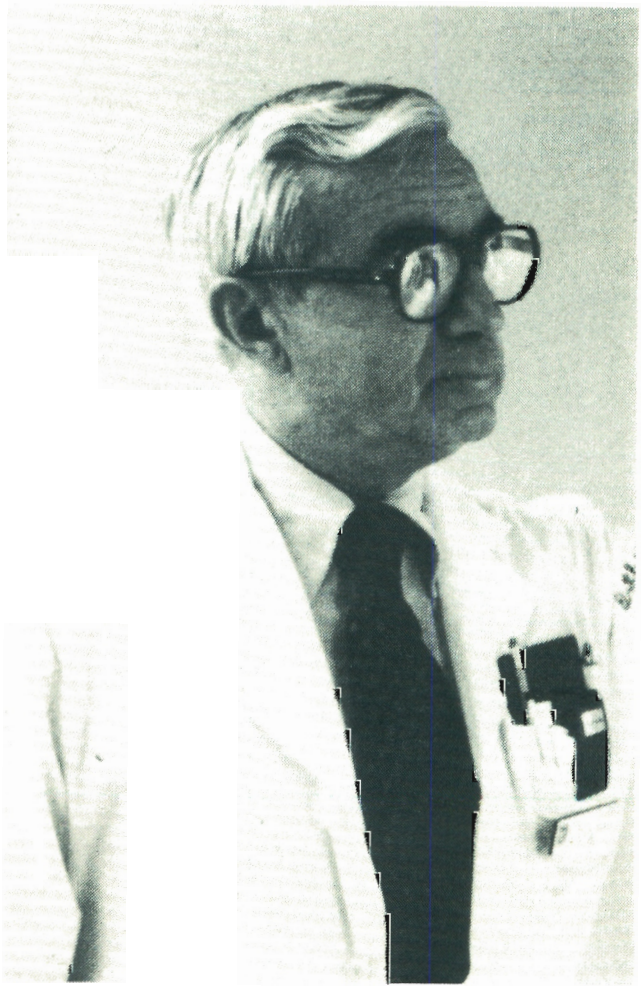

FIG. 41-10. John J. Gartland, M.D., Fifth Chairman, Fourth James Edwards Professor (1970–1985), and first full-time Chairman.

Chief of Orthopaedics at Methodist Hospital (1960–1968) and Chief of Orthopaedics at Lankenau Hospital (1968–1970).

Gartland had a deep interest in orthopaedic education. He wrote *Fundamentals of Orthopaedics,* a textbook for medical students, in 1965, that received national acceptance and by 1986 was in its fourth edition. He was a faculty member in many of the continuing education courses sponsored by the American Academy of Orthopaedic Surgeons and was a frequent contributor to the orthopaedic literature. In 1966 he was invited to become an associate editor of the *Journal of Bone and Joint Surgery,* the official publication of the English-speaking orthopaedic world. He was the first Jeffersonian to be so honored, and he remained active on the editorial board until 1978. Gartland's reputation as an educator grew, and he was elected to membership in the American Orthopaedics Association in 1968.

When Dr. Gartland accepted the Chairmanship in 1970 he became the first full-time Professor of Orthopaedic Surgery and the fourth James Edwards Professor. He saw as his immediate task the need to strengthen the full-time orthopaedic faculty component to complement the volunteer faculty already present and to restructure the residency program to correct the educational imbalance previously noted by the Residency Review Committee for Orthopaedic Surgery. Rather than build an educational structure around the clinical practice of one physician, Gartland believed in a broader based educational program in which the students and residents could be exposed to many teachers, but still one in which the Chairman retained a directing and supervising role.

By 1970 Thomas Jefferson University Hospital had become a sophisticated medical center with a significant level of tertiary care demands. The medical college student body had been enlarged, leading to an increase in the number of affiliated hospitals required for the undergraduate teaching programs. In orthopaedics, specialized care was required for children's orthopaedic problems and for surgery of the hand. The University Hospital was well suited to provide this specialized care. As noted previously, James Hunter's group of hand surgeons was formally incorporated into the department structure as the Division of Hand Surgery. By 1985 this division was supporting four Fellowships in hand surgery yearly and was totally incorporated into the teaching programs of the Department.

Dr. Roshen N. Irani was brought from Children's Hospital in 1972 as the full-time Chief of a Division of Pediatric Orthopaedics within the Department. An affiliation agreement was negotiated with the A.I. Dupont Institute in Wilmington, Delaware, to provide an additional rotation in pediatric orthopaedics for Jefferson residents. In 1982 an additional rotation for Jefferson residents in pediatric orthopaedics was negotiated with Shriner's Hospital of Philadelphia when it became apparent that the Children's Hospital at Elizabethtown might be incorporated into the structure of the new medical school at Hershey, Pennsylvania.

Three men who had trained in orthopaedic surgery at Jefferson under DePalma now headed the orthopaedic services in three of Jefferson's major affiliated hospitals. Phillip J. Marone was Chief at Methodist Hospital, Dr. Hal E. Snedden took over at Bryn Mawr Hospital, and Dr. John J. Dowling replaced Gartland at Lankenau Hospital in 1970 (Figure 41-11).

These affiliated hospitals were incorporated into the newly designed program to provide an experience for the residents in community orthopaedics and trauma. Jefferson's additional agreement with the Wilmington Veterans Hospital allowed orthopaedic resident rotations to that facility for further broadening of the resident educational experience. Cooperative programs were arranged with the Department of Rehabilitation Medicine and the Division of Rheumatology of the Department of Medicine at Jefferson. By 1974 the restructuring of the resident education program was complete and was renamed the Thomas Jefferson University Affiliated Hospitals Program, with a total complement of 24 residents. The new program received full approval from the Residency Review Committee for Orthopaedic Surgery. The restructuring proved successful and gradually developed a national reputation for its excellent clinical and academic background. By 1980 the program was regularly receiving in excess of 350 applications yearly for the six first-year positions from students of the best medical schools in the country.

Gartland viewed himself as orchestrating the best out of all the component parts of the Department. He believed that all the available strengths should be used adequately and fully to provide a well-balanced education for students and residents. He encouraged and supported the development of special clinical interests among his faculty members.

Dr. Jerome M. Cotler became the third full-time member of the orthopaedic faculty in 1973 (Figure 41-12). Cotler had finished his residency under DePalma in 1957 and opened a private practice in Bridgeton, New Jersey. Because of an interest in academic orthopaedics, he gave up private practice to join Gartland as a full-time general orthopaedic surgeon. He proved to be a hardworking and effective member of the faculty, rising eventually to Professor of Orthopaedic Surgery and Vice-Chairman of the Department. He added many clinical strengths, particularly his involvement with the Spinal Cord Injury Center; Thomas Jefferson University Hospital had been designated the regional Spinal Cord Injury Center of the Delaware Valley in 1979. This was a multidisciplinary team effort involving the Departments of Rehabilitation Medicine, Neurosurgery, and Orthopaedic Surgery. Cotler was appointed a CoDirector of this Center and supervised the orthopaedic aspects of the patient care programs.

Cotler was well regarded nationally and served in many important posts, including Chairman of the Board of Councilors of the American Academy of Orthopaedic Surgeons in 1975 and President of the American Board of Orthopaedic Surgery in 1982. He was a frequent contributor to the medical literature and received the Christian R. and Mary F. Lindback Award for Distinguished Teaching in 1979. He remained active in the continuing education activities of the Academy for many years and was elected to membership in the American Orthopaedic Association in 1979.

Gartland turned his attention to reorganizing the orthopaedic research laboratory that had been acquired a decade before, but which had not been

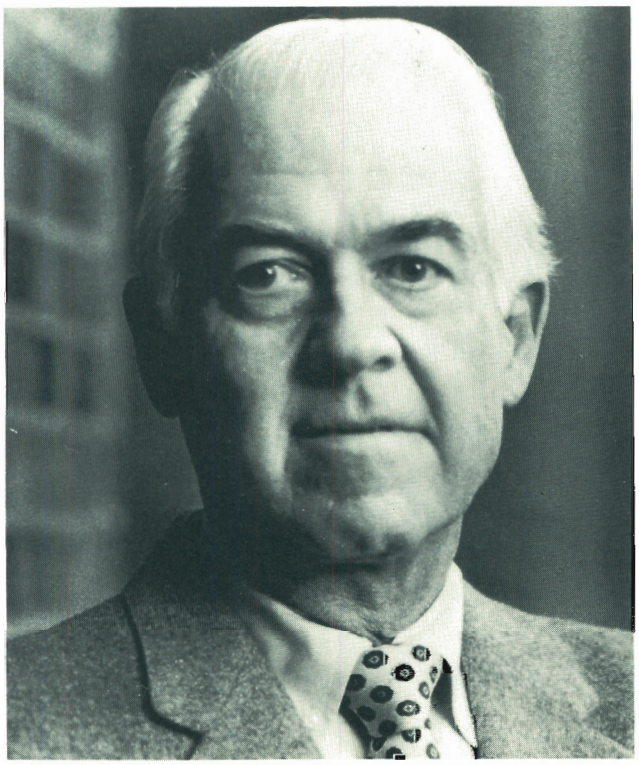

FIG. 41-11. John J. Dowling, M.D., Clinical Professor of Orthopaedic Surgery.

FIG. 41-12. Jerome M. Cotler, M.D., full-time Professor of Orthopaedics, Vice-Chairman of the Department, and Co-Director of the Spinal Cord Injury Center.

effectively utilized in the period 1970–1974. He recruited Peter Frasca, Ph.D., who was a postdoctoral research fellow at Albany Medical College. Frasca's doctorate was in biophysics but his research interest was in bone as a tissue. He joined the Department in 1975 as Research Assistant Professor of Orthopaedic Surgery and Director of the Orthopaedic Research Laboratory. He later obtained a secondary appointment in the Department of Anatomy that enabled him to involve graduate students in his research projects. He was able to obtain National Institutes of Health funding for many of his research efforts and subsequently obtained the first scanning electron microscope on the Jefferson campus.

Podiatry

The care of the feet for such things as the clipping of nails and the trimming of calluses was an area that most physicians were willing to relegate to podiatrists. There had been a question about which of those procedures constituted foot surgery and whether such procedures could be safely and legally performed at Jefferson by podiatrists. Dr. Arthur E. Helfand (Figure 41-13), Professor and Chairman, Department of Community Medicine, Pennsylvania College of Podiatric Medicine, had been providing podiatric services in the hospital and clinics for several years but there was no clearly defined program for him, and therefore his teaching activities were casual. In March of 1977 negotiations were started to integrate him and his work into the Jefferson Medical College and Thomas Jefferson University Hospital Staff. Considerable opposition was met, but because his services and teaching were valuable, particularly to the Division of Endocrinology and Metabolic Diseases, Dr. Gray, Chairman of Medicine, persisted. An arrangement was completed whereby Dr. Helfand received a hospital appointment in the Department of Orthopaedic Surgery in the category of Specified Professional Personnel, to provide consultative services on inpatients and perform minor procedures under local anesthesia at the bedside or in his clinic. His academic appointment was Adjunct Professor of Medicine (Podiatry). His Ambulatory Clinic was established in the area of the Division of General Medicine. Residents in Medicine and students, during their medical clinic clerkship or while on their elective program had the opportunity of working with Dr. Helfand. He authored *Clinical Podogeriatrics* (1981), *Rehabilitation of the Foot* (1984), and *Public Health and Podiatric Medicine* (1987). In March 1985, his appointment was changed to Adjunct Professor of Orthopaedic Surgery (Podiatry).

Further Departmental Expansion

The full-time component of the orthopaedic faculty was raised to four when William C. Hamilton (Jefferson, 1971) became Assistant Professor of Orthopaedic Surgery in 1978. Hamilton had received his orthopaedic education at Jefferson, completing the program in 1976. In the spring of that year he was selected by the American Orthopaedic Association as one of its four North American Traveling Fellows. These

FIG. 41-13. Arthur E. Helfand, D.P.M., Adjunct Professor of Orthopaedic Surgery.

fellowships, sponsored by the American Orthopaedic Association and awarded yearly to senior orthopaedic residents selected by a committee as the best in the country, included a four-week tour of selected orthopaedic centers in North America and Canada. A group of these Traveling Fellows visited Jefferson twice during Gartland's term as Chairman. Hamilton left the full-time faculty in 1982 to go into private practice at Lankenau Hospital but remained active in the Department's teaching activities.

The position of Assistant Professor of Orthopaedics on the full-time faculty was again filled in 1983 with the recruitment of Eric L. Hume. Hume had graduated in medicine from Syracuse but had come to Jefferson to obtain his graduate education in orthopaedic surgery, completing the program in 1983. He proved a happy choice because of his interest in academic orthopaedics. He reorganized the resident teaching program, assisted in teaching biomechanics and psychomotor skills and, in 1985, organized and directed Jefferson's first metabolic bone disease clinic.

Gartland inherited a volunteer group of the orthopaedic faculty who had been working at Jefferson since Dr. DePalma's time. Among them were Drs. John M. Fenlin (Jefferson, 1963), J. David Hoffman (Jefferson, 1956), and Renato J. Nardini. These men joined enthusiastically in the Department restructuring and contributed a great deal of time to the teaching programs. Fenlin developed a special interest in the shoulder joint, including clinical and basic research.

Dr. Scott Jaeger (Jefferson, 1972) joined the Division of Hand Surgery in 1979 after completing his orthopaedic residency at Jefferson and a hand fellowship at the University of Louisville. Dr. Sanford H. Davne, who finished the orthopaedic program at Jefferson, joined the volunteer faculty in 1981 and confined his clinical work to Thomas Jefferson University Hospital. Dr. Mario J. Arena, who finished the Jefferson Residency in 1984, joined Drs. Fenlin and Nardini in practice in 1985, thus further swelling the ranks of the volunteer faculty and contributing to the teaching program and clinical volume.

Physicians involved with teaching orthopaedics to Jefferson students or residents at the affiliated hospitals were offered faculty rank within the Department. A strong and loyal affiliated faculty resulted. By 1985 there were eight affiliated faculty members at Bryn Mawr Hospital, seven at Lankenau Hospital, three each at Methodist Hospital and the A.I. DuPont Institute, and two at the Wilmington Veterans Hospital. Seven of these affiliated faculty members were orthopaedic surgeons who received their orthopaedic education at Jefferson during Gartland's Chairmanship.

In 1971 the senior orthopaedic resident, Dr. S. Terry Canale, now a prominent orthopaedic surgeon in Memphis, Tennessee, persuaded Gartland to undertake the publication of a Department orthopaedic journal as part of the resident's learning process. It was planned that residents would serve as editor and editorial board, negotiate with the printer, plan the layout, and solicit some advertising, with the assistance of a small faculty committee. The idea took hold, and the first issue of the *Jefferson Orthopaedic Journal* appeared in 1972. It has been published yearly since then under the same guidelines. In 1973 the Jefferson Orthopaedic Society adopted the *Journal* as its official publication. Since 1973 the cost of publishing the *Journal* has been divided equally between the Jefferson Orthopaedic Society and the Department. The *Journal* is distributed free to members of the Jefferson Orthopaedic Society and a large group of persons known simply as "Friends of Jefferson." Since the *Jefferson Orthopaedic Journal* has appeared, the Orthopaedic Departments at the University of Iowa and the University of Pennsylvania have begun similar Department journals modeled on the Jefferson publication.

The Jefferson Orthopaedic Society, founded in 1960 by DePalma, had lost most of its forward momentum by 1970. It had deteriorated into a parochial format depending upon orthopaedic residents, Jefferson orthopaedic faculty, and local speakers to put on the yearly program. As a consequence the meetings became less interesting and attendance dropped off alarmingly. Between 1970 and 1974 Gartland and Cotler, because of their national contacts, were able to reverse this trend by the use of an outside invited faculty. The Society membership was persuaded to build its program around a specific orthopaedic theme selected by the Society officers in collaboration with the Chairman. National authorities in the selected area were then invited to come to Jefferson to present their material. Between 1974 and 1985 some of the most prominent orthopaedic

surgeons in North America and Canada spoke at the annual Jefferson Orthopaedic Society meetings. Interest in the Society quickened and registrations of 175 to 200 people for the meeting became common. As an additional aid to the resident education program, a Visiting Professor Program started in 1972 was scheduled for the spring of each year. The senior residents chose the Visiting Professor who came for a two-day visit.

In September, 1976, Dr. Everett J. Gordon (Jefferson, 1937), an orthopaedic surgeon then practicing in Washington, D.C., gave the Chairman a significant contribution to establish the Everett J. Gordon Fund for orthopaedic resident education. Proceeds from this fund allowed the orthopaedic faculty to select the "best resident" each year and recognize the selected resident at the annual Jefferson Orthopaedic Society banquet. In addition to this recognition, the selected resident received an appropriate plaque and an expenses-paid trip to the Annual Meeting of the American Academy of Orthopaedic Surgeons.

During 1981 Dr. and Mrs. Thurman Gillespy generously initiated the Gillespy Fund in the Department to be used for special resident educational needs for which no other funds were readily available. Dr. Thurman Gillespy (Jefferson, 1953) completed the orthpaedic residency at Jefferson in 1958 and subsequently practiced in Daytona Beach, Florida.

In 1984 Dr. Richard D. Lackman was recruited to start an adult musculoskeletal tumor service, the first such service in Philadelphia. Lackman had received his orthopaedic education at the University of Pennsylvania followed by a Fellowship in musculoskeletal oncology at the Mayo Clinic. The service flourished, and Jefferson gained additional stature as a center for adult musculoskeletal tumors. Lackman proved a hard worker and enthusiastic teacher.

Gartland was elected President of the Pennsylvania Orthopaedic Society in 1961 and the Philadelphia Orthopaedic Society in 1970. He served as President of the Jefferson Alumni Association in 1974.[11] In 1977 he was elected Second Vice President of the American Academy of Orthopaedic Surgeons, the largest orthopaedic organization in the world. He became First Vice President in 1978 and assumed the Presidency in 1979, considered the key leadership position in American orthopaedics. He was the second Philadelphian and the first Jeffersonian elected to a leadership position in this organization since its founding in 1933.

Gartland represented orthopaedic surgery in the Council of Medical Specialty Societies from 1980 until elected to the Board of Directors of that organization in 1984. From 1980 to 1985 he was a member of the Board of Trustees of the *Journal of Bone and Joint Surgery,* serving as Treasurer (1982–1983) and Chairman of the Board (1984–1985). With these elections and appointments he represented Jefferson in the highest orthopaedic organizational circles. During 1981 his friends and associates at Jefferson presented his portrait to the University. The excess funds were donated to the Philadelphia Orthopaedic Society to support a yearly Gartland Lecture.

The period 1980 to 1985 was an exciting time for orthopaedic surgery at Jefferson and provided visible evidence of the tremendous growth that had occurred in the Department since its founding in 1904. During one four-year period, 1979 to 1982, members of the Jefferson orthopaedic faculty held the three most highly regarded positions in organizational orthopaedics. Gartland was President of the American Academy of Orthopaedic Surgeons in 1979, G. Dean MacEwen (affiliate faculty) was President of the American Orthopaedic Association in 1981, and Jerome Cotler was President of the American Board of Orthopaedic Surgery in 1982.

Dr. Gartland retired on December 31, 1985, to become the James Edwards Professor Emeritus of Orthopaedic Surgery. He then continued his academic career at Jefferson as Director in the Office of Departmental Review.

Richard Harrison Rothman, M.D., Ph.D. (1936–); Sixth Chairman and Fifth James Edwards Professor (1986–)

Dr. Richard H. Rothman (Figure 41-14) became Chairman of the Department on January 1, 1986. Born on December 1, 1936, in Philadelphia,

he received his B.A. degree (History) at the University of Pennsylvania and his M.D. in its School of Medicine in 1962. After internship at the Philadelphia General Hospital (1963), he took his residency in Orthopaedic Surgery at Jefferson under Dr. Anthony F. DePalma (1963–1968) and also received his Ph.D. in Anatomy from Jefferson in 1965. He became a member of the Attending Staff of the Children's Hospital of Philadelphia and in 1970 was appointed Director of Orthopaedic Surgery at the Pennsylvania Hospital. On the faculty of the University of Pennsylvania School of Medicine, he rose to Professor of Orthopaedic Surgery in 1979. At the Pennsylvania Hospital, the Rothman Institute was named in his honor in 1984.

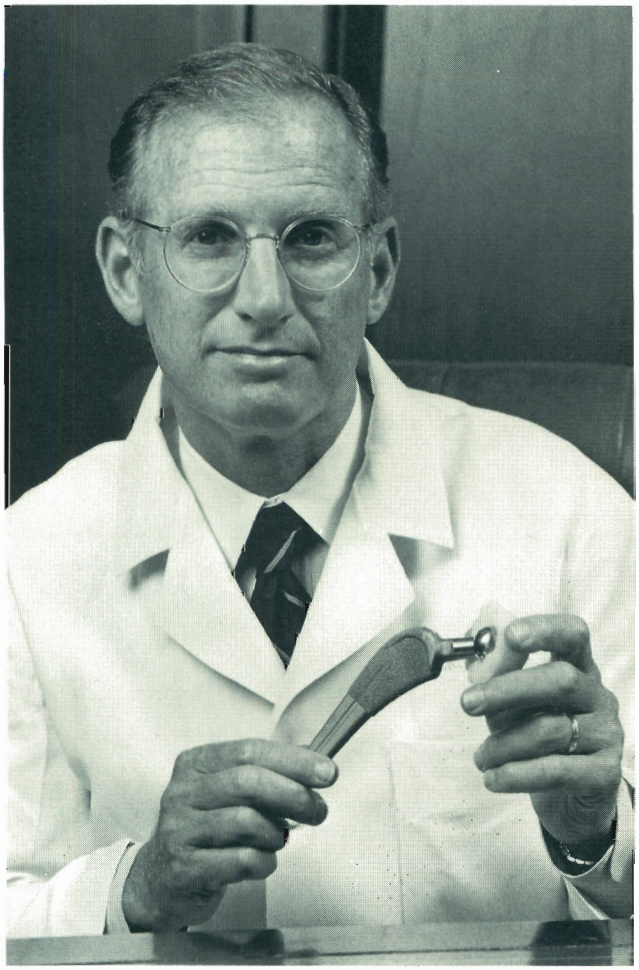

FIG. 41-14. Richard H. Rothman, M.D., Ph.D. (1936–); Sixth Chairman and fifth James Edwards Professor (1986–).

Dr. Rothman brought to Jefferson an impressive experience in administration: Director of the Orthopaedic Research Laboratory of Jefferson Medical College (1969–1970); Vice President of the Philadelphia Orthopaedic Society (1973); Executive Committee, International Society for Study of the Lumbar Spine (1974–1976); President, Jefferson Orthopaedic Society (1976); President, Jefferson Cervical Research Society (1977); Board of Directors of American Academy of Orthopaedic Surgeons; Examiner, American Board of Orthopaedic Surgery; President, Professional Staff of Pennsylvania Hospital (1986); Board Member, Annenberg Institute; Overseer, College of Arts and Sciences of University of Pennsylvania; and Associate Trustee of the University of Pennsylvania.

In addition to memberships in the important societies of his specialty, editorial positions on two journals, and 24 Visiting Professorships, he wrote more than 100 scientific articles and published nine textbooks in orthopaedic subjects.

Dr. Rothman's basic research training and experience were in the study of degenerative changes in connective tissue. He studied the relationship of these changes to blood flow in bone, tendon, and articular cartilage with aging and osteoarthritis. In the realm of clinical research his major emphasis has been on the study of degenerative diseases of the spine, hip, and knee.

On assuming the Chairmanship, Dr. Rothman envisioned his task as one of enriching the Department in terms of its clinical leadership and research productivity. Research both in the basic and clinical realm was an early high order of priority.

The program was modified to expect each Resident and Fellow to be responsible for two major clinical research projects during his or her tenure with the Department that would culminate with manuscripts adequate in quality to be published in national peer review journals. Within two years this was effectively implemented, and 14 original papers were submitted for presentation at the 1988 American Association of Orthopaedic Surgeons' Annual Meeting.

Rothman instituted increased thrust in fundamental research related to the skeletal system. A team was recruited headed by Rocky Tuan, Ph.D., who was appointed as Director of the Orthopaedic Research Laboratories. Dr. Tuan,

educated at Rockefeller University, is a nationally recognized investigator in cellular biology with emphasis on the development of the skeletal system and chondrogenesis. He heads a team of five Ph.D. investigators including biochemists and anatomists. His role is not only the development of research related to the skeletal system but education of the Residents and Fellows in terms of contemporary research techniques and to serve as support function to those clinical staff members who wish to participate in fundamental research. His laboratories, funded by Thomas Jefferson University, are modern, 7,000-square-foot facilities on the fifth floor of the Curtis Clinic. His research has attracted substantial ongoing funding from a variety of sources including the National Institutes of Health.

In terms of clinical development, a variety of new resources were brought to the Department to establish regional and national prominence in patient care. First, a partnership was established with the Rothman Institute at Pennsylvania Hospital that immediately brought to the Department the largest unit for hip and knee replacement in the region. Dr. Robert E. Booth, Jr. serves as Chief of the Rothman Institute and is an accomplished surgeon and investigator in the area of total knee replacement. The number of implants performed annually at this Institute approximates 1,000. The Institute also has as one of its key members Dr. Richard Balderston, who heads the Department's Division of Adult Spinal Deformity and acts as Director of Resident Education. Dr. Balderston is acknowledged as an area leader in this complex area of surgical reconstruction.

Dr. Peter Pizzutillo was recruited as Director of Pediatric Orthopaedic Surgery from the Alfred I. DuPont Institute. He has strengthened the Department's Pediatric Division and has built an increasingly strong and sound research and educational program in this area.

Dr. Keith Wapner was recruited as a member of the full-time faculty to develop and head the new Division of Foot and Ankle Surgery. This is the first regional resource geared specifically for reconstruction of the foot and ankle. There has been a geometric growth in the activity of this Division, which is now seen as a unique resource of the University's educational program.

Dr. Phillip Marone, a longtime member of the Professorial Staff of the Department, has recently been appointed as Director of the new Sports Medicine Program. This program, housed in the Edison Building, is yet another important facet of the patient care and educational program of the Department. Dr. Marone plans to coordinate the faculty members engaged in the varied practice of sports medicine and to develop several cooperative interinstitutional programs of research and education in this field.

Dr. Jerome Cotler was appointed in 1987 as Director of Orthopaedic Surgery for the University Hospital. He thereby assumed responsibility for the management of the Hospital Unit as well as serving as Co-Director of the Spinal Cord Injury Unit. His energy and effective management have led to a doubling of the clinical activities between the years 1986 and 1988.

Dr. Rothman sees as his assignment the continued development of the research activities, teaching programs, and clinical patient care within the Department. It is anticipated that under his direction the necessary human resources, financial support, and energies can be brought to the Department to raise each of these areas of activity to increased national prominence.

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